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Implementing the Kyoto Protocol

The role of environmental agreements

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Foreword

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Executive summary

Voluntary agreements between an industry or a company and the government to regulate various environmental impacts is a popular policy tool in many OECD countries. Since the adoption of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) in December 1997 there has been a discussion of choice of policy tools to implement the Protocol in many industrialized countries. Not enough parties to make it enter into force have yet ratified the Kyoto Protocol, but many parties are making preparations for the implementation phase. This study focuses on the suitability of voluntary agreements to curb emissions of greenhouse gases (GHGs). Can such agreements be a more efficient policy tool than taxes, tradable emission permits, or traditional command and control? In this perspective we examine under what circumstances voluntary agreements could be an attractive policy option from the regulator's (i.e. government's or its agency's) perspective.

Voluntary agreements is a very imprecise term since they can range from declarations of intent from a company, to binding contracts with a regulator with penalties specified in case on non-compliance. Furthermore, such agreements are not voluntary in a strict sense since there in most cases is an implicit or explicit threat from the regulator to impose other policy tools if the company is unwilling to negotiate. Also, if the target is not met the company could meet other, stricter regulations, such as emission fees or the introduction of taxes. These are important reasons why other terms like agreements, environmental agreements, negotiated agreements, codes of conduct, industry covenants, eco-contracts, and self-regulation have been used. For the purpose of avoiding misunderstandings on the nature of such agreements we will in this study denote all as Environmental Agreements (EAs).

A general definition of an EA is:

"An agreement between government and industry to facilitate voluntary action with a desirable social outcome, which is encouraged by the government, to be undertaken by the participant based on the participant's self interest" (Storey, 1996).

In this study we focus on international EAs to curb emissions of GHGs. A general definition of an international EA is:

An agreement between an industry in one country and a regulator in another country, or between an industry in a group of countries and a regional regulator, with the aim to solve a regional or international environmental problem.

The first of these EA types is denoted a bilateral EA, whereas the latter type is denoted a regional EA. Five main conclusions to be drawn from this study are:

1. Experience with Environmental Agreements in a number of OECD countries suggests that these agreements are most attractive as a supplement to traditional command and control, or to market-based policy tools. This finding is also supported by the academic literature.

2. The academic literature indicates that skillful design of Environmental Agreements can improve their efficiency, for instance through including a menu of contracts (i.e.

agreements) the company can choose between, or through the introduction of subsidies in case of over-fulfillment combined with a tax in case of under-fulfillment of the target.

3. Bilateral Environmental Agreements is an interesting policy option to regulate pollution from other countries, provided a general agreement between the two governments is established.

4. Regional Environmental Agreements are rare, even within the European Community, but could have important advantages and be an interesting supplement to other policy tools.

5. Environmental Agreements can play a role as a 'soft' transition stage from traditional command and control to domestic emission trading, and further on to a Kyoto Protocol regime of emission trading and joint implementation.

In terms of the first main conclusion a large variety of EAs is found in a number of OECD countries. Given their undocumented environmental effectiveness, it is odd that EAs have gained such a widespread recognition by governments as an instrument for environmental management. The lack of environmental effectiveness is partly due to a missing specification of baselines and reference scenarios to which the GHG abatement effect is compared and measured, but also due to the fact that regulators do not always participate in setting targets for EAs. Another concern is that the EA negotiation process in many cases is closed for third parties, and consequently more closed than a traditional policy making process in many countries. Such a closed process is undemocratic and can lead to weak EAs. The popularity of EAs may, however, lie in their political feasibility. With the negotiation of EAs, arenas for dialogue, partnership and co-operation between governments and industry have been established. For the industry, EAs are seen as a tool for enhanced predictability in environmental regulation. For governments, EAs may be seen as a tool for a more rapid behavioral change towards environmental accountability within industrial sectors than what is possible in case traditional policy tools are employed. In the long run, however, the societal legitimacy of this instrument will depend upon its demonstrated environmental effectiveness as well as the transparency and openness of the process in which it is developed. Due to these potential advantages of EAs but their undocumented environmental effectiveness, EAs seem most attractive as a supplement to other policy tools.

In terms of the second main conclusion the academic literature on EAs is limited. The literature does not give clear indications of whether EAs should be preferred to other policy tools, but claim that EAs have some potential benefits that can be harvested under some, but likely not the majority of, circumstances. Thus more and broader studies are required to give clear recommendations on the circumstances where EAs should be preferred to traditional command and control and market-based instruments. However, EAs may work well as a supplement to other policy tools under a wider set of circumstances than employing EAs alone.

Studies based on principal-agency theory have shown that menu-based EAs could be an interesting policy tool alternative in a situation of asymmetrical information between regulator and companies. Such EAs can do better than tradable permits and taxes in terms of welfare effects. This conclusion is based on a model where the survival of a specific company (or industry) is a vital constraint. Also of importance is the administrative cost of EAs compared

to other policy tools. The administrative cost is likely to be reduced if the EA is negotiated with an industry federation instead of single companies. However, this could mean a heavier administrative burden on the industry federation.

If EAs are analyzed in an incomplete contract framework one tentative conclusion is that there is some potential for designing EAs in a way that reduces the problem of too lax targets for GHG abatement in companies and industries in EA contracts. One solution can be to introduce a subsidy in the case of over-fulfillment of the target, and a tax in the case of under-fulfillment of the target. Another suggestion from such models is that a shared investment in GHG abatement technologies between the regulator and companies is helpful in this context. As a case in point there are likely benefits for the companies in terms of improved energy-efficiency if investment is made in technologies that reduce GHG emissions. Finally, third parties like NGOs or representatives from the local community can play a helpful role in the negotiations and monitoring process of an EA to ascertain targets that are ambitious enough to be welfare-increasing. Through further analyses in an incomplete contract framework more insights can be gained into the efficient design of EAs.

In terms of the third main conclusion a bilateral EA is defined as a case where a regulator in one country negotiates an EA with a company or industry in another country. Bilateral EAs can be part of a national environmental policy or a supplement to an international environmental treaty. One example of bilateral EAs is the agreements from 1991 between the city of Rotterdam in the Netherlands and a number of German chemical firms to reduce pollution to the Rhine River.

In terms of the fourth main conclusion a regional EA is negotiated between a regional regulator and one or more industries in a group of countries. We have surveyed EAs at European Community level, but find that such agreements are rare. To date there are three agreements of this kind, of which one is with the European automobile industry to reduce CO2 emissions from new passenger cars. There may be significant advantages associated with the development of EAs at Community level, particularly in terms of harmonization of policy instruments and the implications this may have for market and competition conditions for European industries. Consequently regional EAs could more or less counteract the decentralization and de-harmonization drive associated with a large number of national EAs in EU member states. In addition there may be a potential for cost reductions attached to regional EAs. It is also clear, however, that a wider use of EAs at Community level would require a change in EU institutions. Given the current ambiguity with regard to the actual environmental effectiveness of this policy instrument, it might be wise to await further documentation of effectiveness in general and conditions for effectiveness in particular, before embarking upon such a process of institutional change.

In terms of the fifth and final main conclusion EAs can play an important role in a transition phase from established policy tools, and in particular command and control, to a Kyoto Protocol regime of emissions trading, joint implementation, and CDM. Thus the emission permits defined by EAs can later be made tradable at a domestic emission trading market, which later could be part of an international emission trading regime. In this manner national EAs could be a ‘stepping stone’ to full-fledged international emission trading. Alternatively, bilateral EAs could be combined with or develop into joint implementation, or possibly CDM projects.

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1 Introduction

1.1 Background

So-called voluntary agreements between an industry or a company and the government to regulate environmental impacts is a popular policy tool in many countries.[1] In Europe such agreements are common in Denmark, Germany, Netherlands, and United Kingdom. Voluntary agreements are also popular in the U.S. and in Japan. In Norway many industries have been keen to advocate voluntary agreements as a suitable policy tool to curb emissions of greenhouse gases (GHGs) as well, and that such agreements is a more efficient policy tool than taxes. In June 1997 the first voluntary agreement in Norway related to emissions to air was agreed between the aluminum industry and the Ministry of Environment with the aim to curb emissions of greenhouse gases.

Since the adoption of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) in December 1997 there has been a discussion of choice of policy tools to implement the Protocol in Norway and other industrialized countries. Not enough parties have yet ratified the Kyoto Protocol to make it enter into force, but many parties are making preparations for the implementation phase. The discussion in Norway has focused on expanding the present tax system or introducing a domestic tradable permit system. In this discussion, voluntary agreements should also have its place as a viable policy tool alternative.

On this background an interesting question is the potential of voluntary agreements to reduce GHG emissions and implement the Kyoto Protocol. In this study we want to examine under what circumstances voluntary agreements to curb greenhouse gas emissions could be an attractive policy option from the regulator's (i.e. government's or its agency's) perspective.

1.2 Definitions

Voluntary agreements is a very imprecise term since they can range from declarations of intent from a company, to binding contracts with a regulator with penalties specified in case on non-compliance.[2] Furthermore, such agreements are not voluntary in a strict sense since there in most cases is an implicit or explicit threat from the regulator to impose other policy tools if the company is unwilling to negotiate. Also, if the target is not met the company could meet other, stricter regulations, such as emission fees or the introduction of taxes. These are important reasons why other terms like agreements, environmental agreements, negotiated agreements, codes of conduct, industry covenants, eco-contracts, and self-regulation have been used in the literature. For the purpose of avoiding misunderstandings on the nature of such agreements we will in this study denote all as Environmental Agreements (EAs).

A general definition of an EA is:

[1] Voluntary agreements can apply both to industries and single companies. For convenience we will mainly refer such agreements to one or more companies, but keep in mind that in most cases they are just as relevant for a single industry comprising a number of companies, or a group of industries.
[2] For classifications of EAs see e.g. Storey (1996), IEA (1997), EEA (1997a), or Solsbery and Widerkehr (1995).

"An agreement between government and industry to facilitate voluntary action with a desirable social outcome, which is encouraged by the government, to be undertaken by the participant based on the participant's self interest."[3]

A general definition of an international EA is:

An agreement between an industry in one country and a regulator in another country, or between an industry in a group of countries and a regional regulator, with the aim to solve a regional or international environmental problem.

Related to the type of EA is the issue of who determines the target. In most cases the target is a product of negotiations where both regulator and company have influence. This is the target-setting type of EA. The resulting target then depends on the negotiation power of the parties, where one important factor is the distribution of information. If the company has much better information on its abatement cost than the regulator, then the company would be able to negotiate targets closer to their own ambitions. This would be the case even if the regulator may have higher ambitions, and favor a stricter target, i.e. favor lower emissions and/or a faster reduction rate. However, if target setting is entirely up to the company, and the EA is a declaration of intent by the company, the target is likely to be the company's choice only. In this case one could say that the fixing of the target is done before the EA is adopted. In this study we are only concerned with EAs where the regulator has more or less say on determining the target. In other words we do not explore EAs of the 'declaration of intent'-type.

1.3 Aim and organization of the study

The exploration of Environmental Agreements (EA) in this study is carried out in three steps:

I. Advantages and disadvantages of EAs compared to other policy tools, based on theoretical studies and experience from practical use.

II. The potential of EAs as an international policy tool, either in a bilateral or regional setting.

III. The attractiveness of EAs to implement the Kyoto Protocol, and the relation to joint implementation and international emissions trading.

In step I voluntary agreements are compared to alternative domestic policy tools like direct regulation (i.e. command and control), taxes and tradable permits with respect to criteria like:

- environmental effectiveness (i.e. ability to meet an environmental target),
- cost-effectiveness (i.e. minimizing the total cost of meeting the target),
- administrative effectiveness (i.e. the cost of operating the policy tool is lower than for alternative policy tools),

[3] Storey (1996).

- feasibility and political attractiveness, and
- effects on innovation and technological development.

After presenting a classification of EAs in chapter two, chapter three focuses on the effectiveness of EAs compared to other policy tools based on contributions from the literature. Some emphasis is put on particularly interesting contributions from principal agency models and from incomplete contract theory. In chapter four experiences with EAs in the four OECD countries the United States, Germany, the Netherlands, and Norway are discussed. These countries are chosen so as to represent both widespread uses of EAs and a large variety in types of agreements.

Turning to step II, EAs is traditionally a domestic policy tool. However, such agreements can also play a role at the international scene when implementing climate policy. The two broad categories of international EAs are:

- bilateral EAs (where a regulator in one country negotiates an agreement with a company in another country), and

- regional EAs (where an supranational regulator of a regional organization, such as the EU, negotiates an agreement with industries in all or most of its member states).

In this study we will focus international EAs, that is bilateral and regional EAs, and explore their potential as part of a national or regional climate policy strategy. Such agreements between a government and industries could be an interesting supplement or alternative to international treaties implemented through national legislation, or implemented through tax schemes or tradable permits. One interesting issue in this context is the effect of regional agreements on the level of harmonization of environmental regulations for companies and industries in the region consisting of a group of countries.

On this background we explore bilateral and regional EAs in chapter five. Some emphasis is put on institutional requirements for EAs, and the effect of regional agreements on harmonization of environmental regulations among industries in a regional group of countries. For this purpose EU, and in particular the automobile industry within EU, is chosen as a case.

In step III and chapter six, we explore how interesting EAs are as a tool for implementation of the Kyoto Protocol. The focus is now on the international scene and the relation between EAs and the Kyoto Protocol mechanisms joint implementation, clean development mechanism and emission quota trading. This chapter adds to chapter three and four that cover EAs at the domestic scene and chapter five that covers EAs at the international scene.

Finally, in chapter seven the findings of the study are concluded.

2 Classification of environmental agreements

A number of classification systems or typologies for EAs have been suggested in the literature, confer for example EEA (1997a), IEA (1997), and Solsbery and Wiederkehr (1995). Some interesting dimensions for classification are (Solsbery and Wiederkehr, 1997; IEA, 1997):

- Economic sector (e.g. Energy production and transformation, Industrial processes, Residential, Commercial and institutional, and Transport);
- Measures (e.g. Energy-efficiency and conservation, Fuel-switching and cleaner energy, and Promotion of renewable energy);
- Degree of structure (that is degree of detail and the number of companies or sectors that are covered); and
- Degree of legal compulsion.

A relative elaborated mapping of EAs in a diagram is presented in the same two references (e.g. IEA, 1997: 43). The horizontal axis measures the degree of structure and the vertical axis measures the degree of legal compulsion. Furthermore, sector and country coverage within the OECD country group is shown. The diagram demonstrates the large variety of EAs with respect to degree of structure, degree of legal compulsion, and sector and country coverage.

Turning now to international EAs, Table 1 shows a classification of EAs based on geographical scope and location of regulator. A further description of the 5 types of EAs from A to E is given after the table.

Table 1: Classification of environmental agreements (EA).

Geographical scope	**Location of regulator**		
	National	Regional	Regime
National	A. Traditional EA		
Another country	B. Bilateral EA		
A group of countries	C. Multilateral EA	D. Regional EA	E. International industry federation; WTO

Type A
Traditional EAs involve a national regulator and one or more companies or industries in that country. However, there are many types of EAs, ranging from unilateral declarations from a company on environmental targets and timetables that are not legally binding, till specific legally binding contracts between the parties, where the company pays penalties for failure to meet the target.

Type B
In this case of a bilateral EA the regulator in a country negotiate an EA with companies in another (neighboring) country for the purpose of limiting transboundary pollution. The

government in the other country must accept such arrangements. One example is the agreements from 1991 between the city of Rotterdam in the Netherlands and a number of German chemical firms to reduce pollution to the Rhine River.

Type C
In this situation a multilateral EA involving a national regulator and a multinational company operating in many countries is established. The idea is that the multinational company for various reasons may choose to apply the same environmental standards and targets for all its activities and plants in various countries, and not only for plants in the host country where the regulator's jurisdiction applies. Another possibility is that the regulator in the multinational company's host country claims that its regulations should apply to all plants independent of national borders.

Type D
Given that regional environmental regulation institutions exist, such as within the EU, the regional regulator could negotiate an EA with industries and companies in its member states, without directly involving national governments and regulators in each country.

Type E
The final EA type considered is based on some type of international regime. If an international regime is established through, for example, an international industry federation, one option is for the regime to develop regulations and environmental standards that apply to all member companies. In such a case the framework for these regulations could be a type of EA between the regime (e.g. represented by the general assembly of the industry federation) and companies in all member states. The World Trade Organization (WTO) can be another example of a regime in this context.

The EA types A, B and D are explored in this study. Thus we will neither discuss EAs between a national regulator and multinational companies, nor EAs based on an international regime.

3 Effectiveness of environmental agreements compared to other policy tools

3.1 Introduction

With the aim to compare the efficiency of EAs and other types of regulation like direct regulation, tradable permits and taxes, we start out with a brief survey of academic literature in this area. As part of this survey we emphasize contributions from principal agency models, and potential contributions from incomplete contract models. A few studies based on principal agency theory, among them Hagem (1998), exist, but to our knowledge EAs have not been explored with the help of incomplete contract models.

The comparison of the efficiency of EAs and other policy tools will be based on the criteria mentioned in Chapter 1: environmental effectiveness, cost-effectiveness, administrative effectiveness, feasibility and political attractiveness. To a smaller extent the effect on innovation and technological development is surveyed.[4]

To make the discussion more interesting we explore EAs of the binding contract type, where the regulator at least has some role in determining the target. Furthermore the target and timeframe should be clearly specified, and preferably sanctions, such as introduction of taxes, additional fees, or stricter future regulations, in case of non-fulfillment of the contract, should also be clearly specified.

3.2 Literature survey

A general survey of EAs with a focus on case studies and experience in a number of OECD countries can be found in EEA (1997a), IEA (1997), Solsbery and Wiederkehr (1995), Storey (1996), and Wallace (1995). EAs exist in Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, the United States, and the European Community. The variation in conditions of these EAs with respect to target setting, to what degree the commitments are binding, specification of monitoring, and explicit or implicit penalties in case of non-fulfillment etc, is large.

Turning to potential advantages and disadvantages of EAs compared to other policy tools that are discussed in this literature, an overview is shown in Table 2.

[4] For a broader discussion of these aspects, see Sunnevåg (1998).

Table 2: Potential advantages and disadvantages of environmental agreements.

Advantages	Disadvantages
1. Company free to choose most effective means.	i. No guarantee that companies obey the agreement.
2. Adaptability, flexibility and greater long-term stability.	ii. No incentive to do more than the agreed target; might not be demanding enough.
3. Takes into account industry's concerns; and promotes understanding and trust in industry.	iii. Technological innovation may not be promoted unless stated or included in the agreement.
4. Based on consensus, and promotes continuous dialog between industry and regulator.	iv. Transaction costs may limit the number of participating companies/industries.
5. Transfers responsibility to local company level; and integration of environmental improvements into business planning cycle.	v. Danger of non-compliance and "free-riding".
6. Encourages innovation and improves compliance efficiency.	vi. Compliance checks are important. Transparency, accountability and monitoring essential.
7. Potentially more efficient and quicker to implement.	vii. Negotiating agreements can be quite time-consuming, and may be expensive and bureaucratic.
8. Supplies companies with a "green image".	viii. Passing on costs to others through higher prices for goods and services can be difficult.
9. Encourages information exchange on best practices and potential cost savings.	ix. May not be sufficiently credible with the public.

Source: IEA (1997).

In addition to the potential advantages listed in Table 2 the literature mentions benefits such as a high political feasibility compared to other policy tools, a reduced danger of loss of competitiveness compared to taxing, and that the "green consciousness" of companies is encouraged.[5] Segerson and Miceli (1998) mention that EAs can encourage a pro-active cooperation from industry. According to EEA (1997a) EAs have the ability to raise environmental awareness among companies, and they can create consensus between the regulator and companies. EAs can also improve environmental management in industry. Carraro and Siniscalco (1994) find that EAs can play an important role in stimulating environmental friendly innovation in the presence of market failures and imperfect competition. Nyborg (1997) shows that EAs can be Pareto-superior to taxes if precise formal specification of the pollutant is not feasible. In the case of regulating and recycling packaging materials in Norway that she is analyzing, an unambiguous definition of the tax base is difficult, and can give companies incentives to switch to materials that are not covered by the tax.

A number of studies show that EAs under many circumstances will do worse than traditional policy tools in terms of cost-effectiveness and maximization of welfare, confer e.g. Hansen (1997) and Schmelzer (1996). However, under some other circumstances EAs may do better and be relatively more attractive than other policy tools, confer the discussion below in this section.

Segerson and Miceli (1998) and EEA (1997a) find that EAs are relatively more appealing in case of a small number of partners. EEA (1997a) and Ingram and Liefferink (1998) mention

[5] An indicator of high political feasibility of EAs is their high and likely increasing popularity in many OECD countries, confer e.g. EEA (1997a) or IEA (1997).

that a high level of organization of sectors/branches is an important pre-condition for EAs, for one reason because this inhibits free riding by some companies. EEA (1997a) notes that pro-active industries make EAs more attractive from the regulator's perspective.

In terms of economic sectors EEA (1997a) claims that goods production (i.e. manufacturing) is better suited for EAs than other sectors, and that a limited number of pollution sources is conducive for EAs. Carraro and Siniscalco (1994) argue that EAs should be used to reduce pollution in strategically important industries that produce tradable goods. Given that the industry face international competition the regulator can induce firm-specific investments that lead to innovations and reduced emissions through EAs combined with subsidies. The advantages compared to other policy tools are reduced distortion of competitiveness and smaller effects on the company's profits. Glachant (1996) finds that EAs are likely to be less cost-effective with respect to CO_2 abatement in high energy consuming industries due to problems with asymmetrical information. He also contends that EAs are best suited for concentrated industrial sectors in which the heterogeneity in pollution abatement activities and costs is low. Furthermore EEA (1997a) argues that EAs are better suited to mature industries of limited competition since problems with free-riders are likely to be small in such cases.

The literature is somewhat divergent on the scale of environmental problems conducive for EAs. EEA (1997a) finds that the environmental problems should have limited scale, thus a national and regional scale. On the other hand Carraro and Siniscalco (1994) argue that EAs can be used to implement transfers between countries and companies in different countries when regulation is impossible, as in some problems of transboundary pollution or joint implementation, due to the lack of authority over foreign companies.

Ingram and Liefferink (1998) examine the impact of the broader political and institutional context on the application and success of EAs. They find that a consensual rather than adversarial policy style is conducive for EAs. In line with this a 'corporatist', consensus-oriented policy style is generally conducive for EAs. Furthermore a pragmatic rather than legalistic style is also conducive for EAs. For these reason it will be challenging to apply full-fledged EAs at the EU level. Consequently 'lighter' forms of EAs might be a better choice at the EU level, which is also similar to the ongoing practice. The analysts claim that the legitimacy and effectiveness of EAs is enhanced by greater openness, including third party participation.

When it comes to technological progress, Carraro and Siniscalco (1994) argue that EAs are optimal when environmental innovation has positive spillovers on other companies. EAs can play an important role in stimulating innovation of environment friendly technologies in the presence of market failures and imperfect information. Sunnevåg (1998) on the other hand, claims that EAs provides no better incentive for innovation than traditional command-and control. If the regulator should request re-negotiation of the agreement with the arrival of new technology that substantially change marginal conditions of the company, the EA will give particularly poor incentives for innovation.

Finally, EEA (1997a) finds that long-term targets are conducive for EAs because they provide companies with an early signal. Glachant (1996) points out that EAs are attractive in case of very large shared uncertainty about pollution abatement techniques for both companies and

regulator. Schmelzer (1996) emphasizes that enforceable contracts and credible threats is an important precondition for EAs being an efficient policy tool.

Let us end this literature survey by discussing features of EAs that improve their efficiency. According to EEA (1997a) important factors making EAs more efficient are:

- clear targets;
- a clear specification of baseline;
- reliable and clear monitoring and reporting mechanisms;
- technical solutions should be available;
- the compliance cost should be limited;
- the compliance cost should be relatively similar for all companies involved; and
- that third parties are involved in the design and application of EAs.

Segerson and Miceli (1998) find that the company must not have too much bargaining power compared to the regulator, that the background threat must not be too weak, and that the social cost of funds must not be too high (which opens for subsidies that can increase social welfare). Finally, Sunnevåg (1998) shows that the regulator can improve the efficiency of EAs through paying a subsidy for emission abatement beyond the agreed target, which makes the private and social incentives for innovation equal.

Summing up this literature survey, we find that there are relatively few academic studies, including economic studies, of EAs. EAs have some potential benefits, but these can only be realized under some circumstances, and likely not the majority of circumstances. Thus it remains to be shown how attractive EAs are compared to traditional command and control and market-based policy tools. However, as a supplement to other policy tools like taxes or tradable permits EAs may be a safer choice.

3.3 Contributions from principal agency models

An essential feature of the principal agency literature is asymmetrical information between the company and the regulator, meaning that the company has better information about the true abatement cost of the company than the regulator.[6] Furthermore, companies are assumed to possess different technologies leading to different marginal abatement costs. If the regulator chooses direct regulation and fixes an abatement target for each company, possibly equal targets, there is a risk of inferring a very high cost on companies with high abatement cost. In addition, cost-effectiveness will not be achieved since only by coincidence the regulator will be able to set targets that leads to equal marginal abatement costs. Given varying marginal costs and asymmetrical information the likely outcome is not the cost-effective solution (where the total abatement cost of the regulated industry is minimized). Transforming the targets into permits and making them tradable will secure cost-effectiveness.[7] However, given

[6] For a survey of the principal agency literature see for example Hart and Holmström (1987) and Rasmusen (1989).

[7] We denote emission allowances in a domestic system as “emission permits” and emission allowances in an international system as “quotas” to discriminate between permits issued by a national regulator and GHG emission quotas allocated to countries as a result of international negotiations. The allocation of national quotas in the Kyoto Protocol is an example of the latter system.

asymmetrical information the regulator risks setting a total permit for the industry that leads to costs higher than anticipated and running at least some companies out of business.[8] Alternatively some companies may be forced to move to another country with a more lax environmental regulation. Such "side effects" may not be anticipated and wanted by the regulator.

One alternative choice for the regulator is taxing. If the regulator sets a tax level he better controls the inferred marginal abatement cost level of the companies and cost-effectiveness is ascertained. On the other hand he has little control of the induced quantitative effect given limited and asymmetrical information on the marginal abatement cost curves of the companies. In other words both the abatement level of each company and the total abatement level of the industry is uncertain. Of course the regulator could try out one tax level, check the abatement effect, and then adjust the tax level up or down according to the target he is aiming at. Two problems however, are that this procedure may require many years, and that the observed abatement effect also depends on a number of other factors that can be difficult to control for. This could prolong the required adjustment process even further.

Given these shortcomings of both tradable permits and taxes in a situation of asymmetrical information, what potential benefits could EAs have for the regulator in a principal agency framework?

A common modeling approach in the principal agency literature is to assume that there are two company types. One efficient type with relatively low marginal abatement cost, and one inefficient type with relatively high marginal abatement cost, confer for instance Laffont and Tirole (1993). The idea is to let the companies choose between different contracts, consisting of various combinations of abatement targets and financial transfers from the regulator to the company. In our context these contracts can be interpreted as different EAs. Thus a menu of EAs could be designed so that the companies are given incentives to reveal their true abatement costs. To make the efficient company reveal its true abatement costs it must earn an informational rent, confer for example Carraro and Siniscalco (1994). The regulator's task is to design the menu of EAs such that there is an optimal trade-off between cost-effectiveness (where the efficient company must abate more emissions than the inefficient company) and the informational rent. The cost of this regulation system for the regulator is due to the fact that the informational rent lowers net social benefits. The regulator must also consider that the administrative costs of EAs are likely to be higher than for a tradable permit system and a tax system if an agreement has to be negotiated with each company.[9] However, the regulator's administrative cost is reduced if the EA is negotiated with the industry federation, and the industry federation carries out a second phase of negotiation to allocate the emission abatement target among single companies. The total administrative cost need not be reduced if the industry federation's cost is increased accordingly. On the other hand the negotiation process could be more efficient within the industry federation, for instance due to smaller information barriers between companies than between a company and the regulator, and due to established routines for contacts and discussions within the industry federation, leading to an overall reduction in administrative cost.

[8] To simplify the discussion it is limited to a domestic permit system for one industry consisting of a certain number of companies. However, the discussion is also relevant in other cases.
[9] In this perspective the "top-down" regulation systems tradable permits and taxes have lower administrative costs than EAs, since the latter is a "bottom-up" regulation system.

With the aim to explore such EAs further we discuss the model and findings in Hagem (1998). She compares the welfare effect of different domestic climate policy tools under asymmetric information in a situation where the regulator wants to secure the survival of a specific company. Specifically she compares a traditional EA with a fixed abatement target set by the regulator in combination with a financial transfer, to an EA designed as a menu of abatement contracts, consisting of various combinations of targets and financial transfers. The other climate policies considered are a distribution of free permits under a tradable permit system and a fixed production subsidy under an emission tax regime.

The regulator is assumed to choose environmental taxes or tradable permits, which are sold by the regulator, as the policy tools faced by all companies except the specific company the regulator wants to secure survival of. Free trade in national quotas is allowed between developed countries.[10] Even if it is assumed that national quotas are only traded among governments and not among companies, the results are valid if domestic companies are allowed to participate in the international quota market. The emission tax and domestic tradable permit price is equal to the international quota price. Furthermore the regulator is assumed to have all the bargaining power in the sense that the company is offered a take-it-or-leave-it EA. However, the proposed EA is constrained by the company's credible threat of shutting down production if the implied emission abatement targets are too high. The regulator also knows that if the company turns down the EA offer, the company finds it more profitable to close down production than paying an emission tax. The specification of the company's abatement cost function chosen implies that the regulator cannot increase welfare through an optimal trade-off between cost-effectiveness and informational rent. Thus the cost parameter can take only one of two values, and there are only two possible levels of abatement. Notwithstanding this, the study shows that there are advantages associated with EAs formulated as a menu of abatement contracts.

In the case of an EA designed as a menu of abatement contracts the company is allowed to choose between two different combinations of financial transfers and abatement levels. One of these contracts is designed for the efficient company type and the other for the inefficient company type. The design of the contracts ascertains that the relevant company type chooses its "tailor-made" contract. For more details on assumptions and the model the reader is referred to Hagem (1998).

The study shows that an EA with fixed abatement target is welfare inferior to a tradable permit or emission tax system in combination with a production subsidy. A menu-based EA however, is shown to lead to a higher expected welfare level under asymmetrical information than a tradable permit or emission tax system with a production subsidy. Thus this type of EAs may increase welfare compared to a tax regime even though the two policy options lead to equal expected abatement level. An optimal trade-off between cost-effectiveness and informational rent would be possible if the abatement cost function was a continuously differentiable function of abatement, or if the cost parameter was continuously distributed over an interval. In such a case the social welfare associated with optimal menu-based EAs would also be higher compared to the use of the market-based policy tools emission taxes and tradable permits in combination with a fixed financial transfer. Even if the study focuses on the survival of a specific company the results are also relevant for the survival of an entire

[10] In the context of the Kyoto Protocol this means so-called Annex B countries.

industry comprising many companies given that the regulator designs a policy for each company. Alternatively the regulator must design a policy for the entire industry, represented by a single well-informed representative who maximizes the industry's total profit.

Summing up, the study shows that menu-based EAs is an interesting policy tool alternative in a situation of asymmetrical information between regulator and companies. Such EAs can do better than tradable permits and taxes in terms of welfare effects. The study also shows that traditional EAs with a fixed target can be a less attractive policy tool alternative than tradable permits and emission taxes. These conclusions are based on a model where the survival of a company (or industry) is a vital constraint. More research needs to be done on comparing the administrative costs of EAs compared to other policy tools. The administrative cost is likely to be reduced if the EA is negotiated with an industry federation, but possibly at the cost of less optimal agreements for each company in the industry and thus some loss of welfare due to this. After all the best policy tool choice should lead to the highest attainable welfare level, when all costs have been subtracted.

3.4 Environmental agreements implemented as incomplete contracts

To our knowledge incomplete contract theory has so far not been applied to analyze EAs. In this section we present a first exploration of how contributions from incomplete contract theory might enlighten our understanding of the workings of EAs, and how EA contracts can be designed so as to implement the socially optimal abatement level as closely as possible. We take for granted that the regulator's wish and intention is to implement the socially optimal solution.

The point of departure for this theory type is that two parties, for instance two companies A and B, agree on a contract for future delivery of some good or service, for instance an intermediary product to be produced by company A. This good is sold to and used by the buyer company B. We assume that company A must undertake an investment to be able to make this delivery. The investment is only or primarily to the benefit of company B in the sense that it is relationship-specific. Thus the investment enhances the value of trade but is of much smaller value outside of the trade relationship. This leads to a failure of the contract to generate a socially optimal investment level by company A, the so-called "holdup" problem. The result is an under-investment. Hart (1995) presents an overview of the incomplete contract literature. Other references are Hart and Moore (1998) and Che and Hausch (1998). Some of the literature focuses on contracting over the nature or quality of a good to be traded, whereas in another large share of the literature the contracting is over the quantity of a good to be traded.

Applications with contracting over quantity are found in Aghion et al. (1994) and Edlin and Reichelstein (1996). The contract must specify the good to be delivered, the volume, and a price or compensation to the company that produces and sells the good. In practice it is impossible to specify all possible future contingencies that may occur in such a contract, for example related to changes in markets and prices, and this is the backdrop for denoting this theory "incomplete contracts". Furthermore there can be items and conditions that are difficult to observe and/or verify by a third party like the court. If for instance, company A's

investment is non-verifiable or difficult to describe, it is not contractible either. And furthermore, if the investment is not contractible, a court cannot enforce it either. Re-negotiation of the contract can enlarge the holdup problem since company A knows that the buyer company B can use its power position to the detriment of the interests of company A, for instance through pressing the earlier negotiated price down. Remember that company A has undertaken a relation-specific investment at its own risk if the original contract is not honored, that has a small or zero alternative value if the contract is broken and no trade takes place. Thus a re-negotiation option can strengthen the under-investment problem. Some solutions prescribed in the literature to reduce the holdup problem are: committing to avoid re-negotiation of the contract, shared investment between the two parties, participation of a third party, reallocation of rights of control of the two companies, and vertical integration of the two companies.[11] Edlin and Reichelstein (1996) show that incomplete contracts can provide efficient incentives by balancing "holdup contingencies", where an investment is under-compensated (through a holdup tax), against "breach contingencies", where an investment is overcompensated (through a breach subsidy). They also find that the remedy of enforcing the contract through court has advantages compared to a compensation remedy where the parties are free to breach the contract unilaterally against the payment of compensation to the other party. This compensation should make the other party just as well off as in the case of fulfilling the contract.

We can now define the two contracting parties as a regulator and a company, where the traded good is GHG abatement. Thus the regulator and company agrees on a contract where the company is to deliver a specified volume of GHG abatement at some future time against some compensation from the regulator. This compensation could take the form of tax exemptions, or be some other change in the regulation environment of the company that increases its profits. The required investment by the company is to a large degree assumed to be relation-specific, and thus of small value for the company except the GHG abatement effect, which is primarily to the benefit of the regulator. If re-negotiation is allowed the regulator could employ its power position to reduce the compensation to the company, or introduce new and additional regulations that are costly for the company.

The next step is to interpret such an incomplete contract as a type of EA. As we have noted above this easily leads to under-investment in GHG abatement technology by the company. In this context under-investment in GHG abatement can be interpreted as the company only being willing to agree on a GHG abatement target that is too low to be socially optimal. However, we can assume that the holdup problem is somewhat reduced in this case since the assumption of a pure relation-specific investment seems to be unrealistically strong. When a company for example invest in new technology that abate CO_2 emissions this is likely to be linked to a more energy-efficient technology that saves the company energy expenses and may have other additional benefits as well.

Summing up this first exploration of the potential of EAs implemented as incomplete contracts, the discussion suggests that EAs should be designed in a way that reduces the

[11] In this context rights of control can be interpreted as ownership of shares or equities (for short assets) of the two companies, which give the owners the right to participate in annual meetings and elect directors. One option to reduce the holdup problem is then to give one of the parties alone 'control' of all the assets, thus becoming a residual claimant to the transaction, which gives the correct incentives to invest efficiently (Che and Hausch, 1998).

problem of too lax targets for GHG abatement for a company or industry. One suggestion is to introduce a subsidy in case of over-fulfillment of the target, and a tax in case of under-fulfillment of the target. A certain aspect of shared investments in GHG abatement technology between the regulator and company, meaning that there are likely benefits for the company in terms of improved energy-efficiency as well, is also helpful in this context. Another idea is to engage third parties like NGOs or representatives of the local communities of the company in the negotiations and monitoring process of the EA. Further analysis of EAs in incomplete contract framework is likely to yield more insights in the efficient design of EAs and their efficiency potential compared to traditional policy tools.

4 Experience with environmental agreements in four OECD countries

4.1 Introduction

In this chapter we review experiences with EAs in four OECD countries, namely the United States, Germany, the Netherlands, and Norway.

The use of negotiated environmental agreements between government and industry started in the late 1970's, but accelerated in the mid 1980's (IEA, 1997; EEA, 1997a). By 1996, the number of EAs within the EU region is estimated to a total of 300, covering a broad specter of sectors and environmental issue areas (EEA, 1997a). Within the OECD, the number of EAs targeted towards mitigation of energy-related CO_2 emissions alone is estimated at 350 in 1995/96 (IEA, 1997).[12] There are, however, large variations between countries in their use of EAs as an instrument for environmental management. For instance, around two thirds of the EAs within the EU region are in Germany and the Netherlands (EEA, 1997a). A caveat with these numbers is that inconsistent data makes it very difficult to calculate the number of EAs accurately (not least as a result of large variations in the manner in which the phenomenon is and can be defined). Nevertheless, these numbers indicate that although EAs are relatively recent on the policy arena, they have become an increasingly popular instrument for environmental management (see also Gebers, 1998).

While EAs have become a favored policy tool in environmental management, their environmental- (and cost-) effectiveness has not been conclusively documented. This is in part due to the novelty of this instrument: although the number of EAs currently in operation is high, there are relatively few EAs that have been concluded. Hence, the basis for conducting systematic and consistent analysis of the effectiveness of this policy tool is weak. It is also a problem, moreover, that the baseline, reference, and monitoring data on the EAs that actually have been concluded or have been in operation for some time often are too inaccurate and inconsistent to serve as a basis for systematic environmental assessment.

EAs may be categorized in terms of at least two dimensions. First, EAs may be categorized in terms of who are *partners* to the agreement (see Table 1 above). According to this typology, industrial partners to an EA may be located in the same country, another country, or may constitute a union of businesses representing a group of countries. Governmental partners (the regulator), on the other hand, may be located at a national, regional or international level of governance. Most EAs currently in operation, however, seem to fall within one category in this typology; the "traditional" EAs in which the agreement involves a national regulator and a company or industry within the same country (type A in Table 1 above). The typology in Table 1 is thus primarily directed towards distinguishing between EAs that currently are in operation, that is traditional EAs, and variants of international EAs. Second, EAs may be categorized according to the nature of the *objective* of the agreement. The EEA, for instance, distinguishes between two main types of EAs in their country study of EAs in EU member

[12] The number of EAs concluded in EU (300) and on energy-related CO_2 emissions within OECD (350) are not directly comparable due not only to different targets (i.e. CO_2 reduction or e.g. recycling of waste materials), but also to different coverage and thresholds of the types of EAs counted.

states; target setting EAs and implementation EAs. In the first type of agreement, the target as such has been negotiated and set by partners to the agreement whereas in the second type, the aim of the EA is compliance with targets that are already set (by governments) (EEA, 1997a: 54). The typology may also be expanded as in Storey (1996), to include performance-based EAs, co-operative R&D EAs and monitoring and reporting EAs.

On the basis of existing literature, this section surveys general experience with EAs as a mode of environmental management in four of the countries where this instrument has been used; the United States, Germany, the Netherlands, and Norway. A typology based on the nature of the *objective* of the EA seems best equipped to distinguish between the types of EAs currently in operation and thus constitutes our point of departure in this brief survey.

4.2 The United States: Partners for the environment

In the United States, environmental agreements between government agencies and industry have become a central instrument in pollution prevention, although the total number of such agreements is not known (EEA, 1997a). In February 1991, the Environmental Protection Agency (EPA) launched its 33/50 Program – an initiative to encourage firms to voluntarily reduce releases and transfers of 17 toxic chemicals (Arora and Cason, 1995). The program is regarded as a great success. The program is, for instance, reported to have contributed to a quicker achievement of reduction targets (EEA, 1997a; Arora and Cason, 1995). The perceived success of the 33/50 Program triggered the initiation of EPA's "partnership programs", collectively referred to as "Partners for the Environment".[13] At present, a large number of partnership programs have been developed which cover a broad spectre of industries and environmental issue areas. The major governmental partners to these agreements are EPA and the Department of Energy (DOE).

There are three main types of EAs in the USA; performance-based EAs, co-operative R&D EAs, and monitoring and reporting EAs (Storey, 1996). While performance-based EAs may have similarities with both target and implementation EAs, these types of EAs are not necessarily associated with an explicit commitment to improve environmental quality in terms of some target or procedure. Performance-based EAs, for instance, are defined as comprising negotiated performance goals where participation primarily is motivated by economic benefits and/or by "the perceived market and corporate credibility benefits associated with being viewed as environmentally responsible" (Storey, 1996:15). Environmental improvement, therefore, seems to a larger extent to be defined as a possible side-effect from measures that are judged useful in their own right, such as the development and implementation of new technology, or monitoring of achievements towards some specified goal.

In the USA, EAs are often directed towards environmental problems not addressed by laws and regulations, such as GHG emission reductions and energy efficiency. The US EAs are usually not *negotiated* agreements between government agencies and industries. The programs are often initiated by government agencies, and industries are then encouraged to "sign up". Hence, the agreements are completely non-binding and non-committing for the industries and firms that participate, and they can exit or renege on the agreements at any time (Arora and

[13] EPA internet sites: *http://www.epa.gov/partners/pfe.htm* and *http://www.epa.gov/epahome/industry.htm*.

Cason, 1995). While some EAs specify a reduction goal and a timeframe (for instance, the 33/50 program), many EAs do not focus directly on explicit targets of environmental improvement, but rather on measures which are beneficial in their own right, and which also may lead to environmental improvements. In Climate Wise, for instance, which is "a voluntary program that encourages industry to adopt flexible, comprehensive approaches to reducing greenhouse gases", the goal is to "encourage…the reduction of energy use and greenhouse gas emissions…through cost-effective, flexible actions"; to "change the way companies view and manage for environmental performance by demonstrating the economic and productivity gains associated with 'lean and clean' management"; and to "foster innovation by allowing participants to identify the actions that make the most sense for their organizations" (EPA, 1996: 9; see also EPA, 1998).

The adoption of environmental agreements as *supplements* to traditional command and control regulations implies, in some cases, that the legal status of the agreements is ambiguous (Glasbergen, 1998). With the initiation of the 33/50 program in the USA, however, EPA's enforcement role in the program is made clear: "No company or facility will be singled out for enforcement because of its participation or decision not to participate in the 33/50 Program. Conversely, vigorous enforcement will proceed, regardless of participation in the 33/50 Program where we have discovered violations of environmental requirements" (EPA, 1991; see also Arora and Cason, 1995).

The main motivation for firms and industries to join partnership programs lies in improved access to information, a profit potential (for instance by turning waste into a commodity) and in the corporate credibility benefits associated with the various forms of acknowledgement and recognition by the EPA that the programs imply. It is illustrative that the slogan for Climate Wise is "Turning Energy Efficiency and Environmental Performance into a Corporate Asset".[14] In the 33/50 Program, EPA acknowledgement is given in the form of a "certificate of appreciation for voluntary participation". These certificates are reportedly "prized by industry and often used to launch new product lines or as bargaining chips in vendor selection preference" (EPA, 1996:6).

According to EPA, the results of the Partners for the Environment efforts are "impressive" (EPA, 1998: 1). By the end of 1996, the programs counted 6 882 participating organizations, which together have, "reduced 5.2. million tons of solid waste annually; saved 199 trillion BTU's of energy; prevented 24.7 million metric tons of greenhouse gas emissions; reduced more than 750 million pounds of toxic emissions; and conserved more than 1.2 billion gallons of water" (EPA, 1998:1). EPA also points out that, "the voluntary partnerships fostered by these programs are not just good for the environment; they make good business sense and prove that pollution prevention pays" (EPA, 1998: 1). The programs have reportedly generated economic savings in the magnitude of $852 million in 1996, and annual economic savings are expected to be $4.6 billion by the year 2000 (EPA, 1998: 1).

The profit potential associated with these agreements, therefore, seems to be substantial. In a sense, herein also lies the problem with assessing their environmental effectiveness. In the reporting of the results of the programs, no effort is made to measure or quantify *excess* environmental improvement generated by these partnership programs. That is, there is no

[14] Internet site: *http://www.epa.gov/climatewise.*

reference scenario or baseline information against which to judge how much of the reported results (pollution reduction) that would have come about even in the absence of these programs. Given the profitability of the measures implemented, it is highly unlikely that none of them would have materialized in a non-EA situation. Thus, the reductions achieved in the period when the programs have been in operation can not all be credited the programs. It is possible, however, that the improved information and dialogue between government agencies and industry associated with these programs, their ability to facilitate changes in product lines and environmental performance, as well as the general sentiment of co-operation, trust and partnership generated, may have served to enhance the *rate* of change towards environmental accountability within industries, perhaps rather than the *level* of pollution reduction achieved in the long run. The over-compliance reported in the 33/50 Program could be interpreted in this light. The 33/50 Program achieved the target of a 50% reduction in releases of the 17 chemicals almost one year ahead of schedule (EPA, 1996). The total reduction achieved by the target year (1995) was 50.6% (EPA, 1998).

The actual environmental effectiveness of the partnership programs initiated by the EPA is, therefore, uncertain. While these programs certainly do not harm the environment, there is no documentation of their superiority over more traditional command and control regulations either. On the other hand, the partnership programs may serve to replace a sense of enmity between environmental agencies and industry with a sense of partnership and co-operation, from which the enforcement of traditional command and control regulations may benefit. In this regard, the partnership programs may serve to enhance the overall effectiveness of environmental policies. Given the rapid increase in their use and their increasingly central role in US environmental policies, the results of the partnership programs need to be subjected to a critical scrutiny to ascertain their environmental effectiveness.

4.3 Germany

In Germany, EAs have become a much-used instrument in environmental policy. In 1996, there were 60-90 EAs in operation.[15] Within the EU, only the Netherlands exceeds the number of EAs in Germany. The German EAs mainly cover four areas: waste management; the phasing out of specific substances; discharges of dangerous substances into the water, and CO_2 emissions (CEC, 1996).

The most significant difference between the type of EAs found in Germany and those found elsewhere in the EU, is that public authorities often are not formally involved in these commitments (EEA, 1997a; CEC, 1996). The commitments thus take the form of unilateral declarations by industry. These declarations are, however, usually the result of “intensive discussions with the competent ministries (environment, economic affairs) and recognized in an informal way, for instance a press release or a press conference of the ministry concerned” (CEC, 1996: 24). Informal governmental involvement is also reflected in that virtually all of the declarations contain reporting requirements of industry (CEC, 1996). In 1996, however,

[15] The number of EAs in Germany seems a typical example of the inconsistencies that may be found in such data: EEA, 1997a count 93 agreements, EEA 1997b maintains that there are 60 agreements, while the EU commission counts 80 agreements (CEC, 1996).

development towards a more public approach is indicated, for instance in the governmental involvement in EAs established to reduce emissions of CO_2 (CEC, 1996).

EAs are seen as a key element in Germany's implementation of its CO_2 emissions reduction target of 25% (of 1990 level) by 2005 (EEA, 1997b).[16] In 1996, an EA between the German government and a number of industry associations directed towards the reduction of CO_2 emissions was agreed upon. 19 associations covering a broad range of sectors are involved in the agreement. Together they represent around 80% of industrial energy consumption and 99% of public electricity production (EEA, 1997b). The EA has been developed over several years. The first discussions between the German government and industry associations started in 1990 and resulted in an Initiative Paper in 1991, which basically was a letter of intent. The discussion lost its momentum, however, until the impending Berlin Conference generated a need for tabling a German proposal. The government started a process of negotiating an EA with the German industry association (BDI). The first version of the agreement was made public in 1995. The publication of the agreement led to significant public criticism, particularly by NGOs, which contributed to significant changes in a revised agreement which was made public in 1996 (EEA, 1997a,b).

Ever since the climate change problem surfaced on the international political agenda, particularly with the 1992 Framework Convention on Climate Change, the German government has considered solutions in the form of a carbon/energy tax and/or a waste heat ordinance (EEA, 1997b). The main motivation for industries to join the EA was to *avoid* the implementation of these instruments. Thus, the "voluntary" aspect of the agreement is questionable. According to Bergmann et al.,

> "the situation is more like 'showing the instruments of torture to the victim as a first step of ordeal'. Comparable to what, in former times, tormentors would do with their tools, the Minister for the Environment presents a draft for an ordinance to extract 'voluntary' concessions (…). The government uses the 'threat' of enforcing restrictive legal norms as a starting point for negotiating an agreement. … The business community thereby obliges itself to act in a certain manner, and government in return refrains from coercing them to display the desired conduct" (1998: 158).

The agreement is a target-setting EA. This usually implies that the target itself has been set through negotiations among the partners of the agreement. In the German case, however, the government does not seem to have taken an active part in actually negotiating the targets. The industry associations set the reduction targets themselves in accordance with what they judged to be "feasible" reductions. Also, there does not seem to have been inter-industrial negotiations on target sharing (EEA, 1997b; Bergmann et. al., 1998). The targets were also vaguely formulated. In the 1995 agreement, targets were formulated as *up to* 20% reductions in specific CO_2 emissions (with 1987 as reference year). A total reduction target was usually

[16] As a member of the EU, Germany is committed to an 8% reduction in GHG emissions (of 1990 levels) by 2012 by the Kyoto Protocol. Prior to the Kyoto meeting, the EU agreed upon an internal distribution of CO_2 emission reductions among its member countries according to which Germany is committed to a 25% reduction (see, for instance, Ringius, 1999). After the Kyoto Protocol was adopted the EU revised the internal distribution of CO_2 emission reductions in June 1998. The new commitment for Germany is at 21%.

not offered (EEA, 1997b). In the 1996 agreement, the target is set to a 20% reduction with 1990 as reference year, but the target still refers to specific energy use and CO_2 emissions rather than total emissions. Also, there is no individual target set for each of the companies, and there are no intermediate targets, only endpoint targets for 2005.

The target is based on an estimate of what constitutes an achievable target for all participating associations. Moreover, EAs of several associations are conditional upon a set of ambitious prerequisites that are unlikely to be fulfilled (Bergmann et. al., 1998; EEA, 1997b). It is therefore questionable whether anything more than "business-as-usual" is achieved with the EA. The government does not, however, want a "business-as-usual" approach, it wants a "no-regrets plus" approach (EEA, 1997b). While the agreement does not involve explicit sanctions, the government emphasizes, "that it is prepared to introduce significant regulatory measures if it believes that the EA is not being taken seriously by industry" (EEA, 1997b: 39). The revised 1996 agreement does include monitoring requirements: all companies over a certain size have to report their energy use annually. These data are then used to calculate CO_2 emissions, and these calculations are subject to verification by an independent agency. If the targets themselves are set too low, however, monitoring will not reveal how "seriously" CO_2 emissions reductions are taken by industry, and it is not clear under which circumstances the government will enforce its threat of adopting regulatory measures.

The level of ambition in the targets should be judged against the historical emissions trends in the period before the EA was adopted. Most of the targets adopt 1990 (or in some cases even 1987) as a base year, even though the targets are set in 1995. This is one major problem with the German EA to reduce CO_2 emissions. 1990 was a year that was dominated by the reunification of Germany and the substantial industrial restructuring that followed in its aftermath. It is clear that the reunification of Germany and the significant decrease in industrial production in Eastern Germany resulted in substantial emissions reductions even without an active climate policy. It also seems clear that most of the targets chosen by the associations to a very large extent reflect these trends rather than a serious effort to reduce CO_2 emissions further. Thus, for many of the associations, these targets are easily achievable, and would probably have come about even without the EA (EEA, 1997b; Jochem and Eichhammer, 1996). Indeed, EEA notes that "the real targets for the EAs to achieve are less ambitious than a first appraisal would suggest, given past progress, and indeed very much in line with historical trends in energy efficiency improvements and CO_2 reductions" (EEA 1997b: 65). Moreover, many of the declarations have overlapping target groups and targets, which further complicates monitoring and accounting substantially (Jochem and Eichhammer, 1996). This is probably also reflected in the reported achievements in that, "several of the reductions are likely to have been counted twice" (EEA, 1997b: 65).

An interesting observation is that German business, according to BDI, favors EAs as a first and intermediate step to an emission trading regime. If emission permits are allocated through EAs in this manner they could hope to get the permits for free, confer the discussion in section 6.3 below.

While the targets of the German EA to reduce CO_2 emissions seem to be met by industry, there still seems to be general agreement among analysts that the agreement is not very environmentally effective (*inter alia*, Bergmann et al, 1998; Jochem and Eichhammer, 1996; EEA, 1997a, b). EEA, for instance, points out that "it is generally accepted that the tax and

ordinance would have introduced stronger incentives for energy efficiency improvements than currently exist under the EA" (1997b: 68). EEA also notes, however, that "the German EA is unique in its broad coverage of different industry sectors", and that "it also establishes a process which can be adapted and improved" (1997b: 68). For the German EA to be environmentally effective, improvements, particularly to strengthen emission reduction targets are required.

4.4 The Netherlands

The Netherlands is perhaps the OECD country in which EAs – known as covenants – to the largest extent have become an integrated element in environmental management policies. Currently there are well over 100 EAs in operation in the country (EEA, 1997a; Glasbergen, 1998). The agreements mainly cover waste management, the reduction of various emissions, clean-up of contaminated soil, energy saving and reduction strategies for industrial noise (CEC, 1996).

EAs were introduced in the late 1980's as a new policy instrument to give new impetus to established relationships between the public and private domain (Glasbergen, 1998). While it is recognized that the responsibilities of public and private domains are different, their relationship is also seen as a key factor in tackling environmental issues (Glasbergen, 1998). While the first EAs merely were "test cases", the application of this instrument "has gradually led to a new concept in governance. An essential characteristic of that concept is the effort to develop a policy that connects the assumed collective advantages of environmental policy with the individual (economic) possibilities and limitations of companies and sectors of industry" (Glasbergen, 1998: 133-4).

The development of EAs as a "new concept in governance" has been a learning process which has undergone three phases (Glasbergen, 1998). In the first phase, EAs were generally "gentlemen's agreements". Rather than introducing a "new track" in environmental policy, they constituted confirmations of a development which already was under way, spurred by other driving forces: "The covenant represents more or less a final stage in a policy process that has already run its course. This instrument formally confirms the options that are both technically and economically feasible. Various alternatives are available, and the companies involved are already moving in the desired direction. They are motivated to do so by market demand" (Glasbergen, 1998: 136). In this phase the EAs mainly served a strong symbolic function with limited policy impetus. The EAs of this phase were all single-issue / single-actor agreements.

Gradually, the shortcomings of the EAs became a central topic of discussion. In particular, their ambiguous legal status was a central concern. Their enforceability had not been tested, and their role in between different levels of governance was ambiguous. In several cases where EAs for some reason were in conflict with legislation, the court ruled to the effect that "basically, a covenant is a voluntary agreement that cannot contradict the system of public law" (Glasbergen, 1998: 141).[17] Hence, in cases of conflict, public law has legal superiority.

[17] Two situations in particular may generate a conflict between private (EA) and public law (Glasbergen, 1998). In the first situation, a government may deviate from formal requirements stipulated in a private agreement made

On the other hand, however, it is also unclear whether EAs have contractual obligations that will hold up in a court of law, for instance in cases of non-compliance. Thus, while governments may deviate from EAs in subsequent legislation, thus creating uncertainty and unpredictability for industry, it is also unclear whether governments can sanction non-compliance through the legal system. In this perspective, both parties may wish a stronger legal status for EAs.

The debate also revealed, however, that there is a contradiction between the *voluntarism* of EAs and requirements to their (legal) *enforceability*. An EA is an agreement that is made between (equal) *partners*, and it is an arrangement of their own volition. The voluntarism of the arrangement thus implies that an agreement will be made only to the extent that it serves the interests of both parties. The government employs EAs as an instrument of policy to generate a change in behavior. Private parties, on the other hand, agree upon EAs to the extent that they serve their business interests (which usually are financial and economic in nature) (Glasbergen, 1998). A central feature of EAs is a flexibility which is not compatible with legislation: "Unlike legislation, which in principle must be enforceable with no loopholes – on paper, at least – a covenant derives its value in part from the opportunity to circumvent that requirement. The flexibility this creates for applications of the instrument is precisely its value. An assessment that is based on legal technicalities has only limited significance when flexibility is required" (Glasbergen, 1998: 142).

The ambiguities and shortcomings of EAs notwithstanding, in the second phase, "the idea has taken root that the covenant is a vehicle by which policy can be brought to bear in a quick and effective manner" (Glasbergen, 1998: 136). Also, the EA conformed to a new philosophy of "internalization" which denoted that, "if the process of environmental change is to continue, the private sector itself will have to tackle the problems" (Glasbergen, 1998: 136). This new philosophy reflected a consensus among all participants that environmental management must go hand in hand with an effort to maintain a competitive industry. In this phase, the single-issue / single-actor covenant still dominated, but a new type of agreement was also introduced; single-issue agreements in which more complex branches of industry were involved (one party representing a large number of firms and businesses).

The introduction of the first National Environmental Policy Plans (NEPP and NEPP Plus, published in 1989 and 1990) triggered yet another change in the position and role of EAs in the Netherlands (CEC, 1996; Glasbergen, 1998). In the national policy plans it was recognized that a major policy effort to reduce emissions of various substances was necessary. Reduction targets of 70 to 90 % by 2010 were set (Glasbergen, 1998). The question then arose, of how to motivate the concerned industries to make such drastic reductions. A new policy strategy, referred to as "target-group policy", in which EAs played a key role, was developed (Glasbergen, 1998). The target-group policy was a "concerted effort to develop an appropriate structure for implementing environmental policy" which allowed for "a stepwise translation of the national targets for emission reduction [decided in the national policy plan] to targets for sectors of industry" (Glasbergen, 1998: 147). Seven target groups were identified: industry, agriculture, transport, consumers, the construction industry, the energy sector and refineries

at an earlier stage. Hence, (new) legislation may be in conflict with permits and requirements of (old) EAs. Another situation which may generate conflict is when an EA agreed upon at one level of governance is in conflict with legislation at another (municipality versus state, for instance).

(EEA, 1997b). With the target-group approach, the multiple-issue / composite-actor covenant was introduced.

The transformation of national targets to targets for industry is seen as a process that is intended to be of a cyclical and incremental nature. In this regard, the development of EAs as a *learning process* is in a sense institutionalized in the Dutch EA "system". The process is constituted by three steps (Glasbergen, 1998): 1) Setting up targets for the industrial sectors; 2) Making these targets operational on company level; 3) Providing feedback of results and monitoring of the process.

Currently, therefore, Dutch EAs are mainly implementation EAs. The first step of the process of developing EAs for industry sectors does not involve the setting up of *national* targets, but the *transformation* of existing national targets to industrial targets. The national targets are, in principle, not open to negotiation although it is possible for the branch "to offer constructive criticism on the technical and financial feasibility of these goals" (Glasbergen, 1998: 148). Also, the time frame is open to discussion (with 2010 as a fixed end point) (Glasbergen, 1998: 148).

With this approach, the Dutch government has set up a framework within which EAs can be developed: the core elements have been defined, and the activities are tied to deadlines (Glasbergen, 1998). Also, since the plans and progress reports are made available upon request, the process is transparent and public. Finally, the cyclical nature of the process provides options for improvements and learning.

The Dutch EAs seem to be in good progress, although targets are not always reached. A study of EAs on energy efficiency improvements, for instance, shows an average annual energy efficiency improvement of 1.7% against a goal of 2.0% for the period 1989 – 1995 (Rietbergen et al., 1998). The same study concludes that, "the results of three assessments [of goal achievement, effectiveness and efficiency] indicate that about 25–45% of the energy efficiency improvement in the Dutch industrial sector can be attributed to the implementation of voluntary agreements", and that "voluntary agreements are more cost-efficient policy instruments for improving energy efficiency than purely subsidy-based schemes" (Rietbergen et al., 1998: 1). The EEA reports of a similar trend for the EA with the chemical industry (1997b). They find that "there have been reductions in emissions since 1992 for all except four pollutants". They also find that "environmental effectiveness can be claimed, since the assessment against the baseline suggests that the EA has resulted in emissions reductions, for 33 of the 61 pollutants covered, above the level which could be expected on the basis of past trends" (EEA, 1997b: 70).

4.5 Norway

Compared to most other countries few EAs have been made in Norway. The first EAs, established in the period 1994-96, were concerned with reduction and recycling of packaging waste.[18] In these target-setting EAs the industries commit to collect and recycle 60 to 80% of several broad categories of packaging materials. Several business organizations and the

[18] Confer the overview in Nyborg (1997).

Norwegian Ministry of Environment were parties. If the targets are not met the Government made it clear that a tax on packaging materials would be considered.

The first EA concerning reduction of emissions of GHG was negotiated and signed in June 1997 by the Norwegian aluminum industry and the Ministry of Environment, confer Ministry of Environment (1997). This is the first, and so far the only, EA in Norway where the target is to curb GHG emissions within an industry (or company). The target is to reduce process-based emissions of GHG in the aluminum industry by 55% per ton of aluminum produced in year 2005 compared to the base-year 1990. The reduction objective is equivalent to 2,2 million tons CO_2 equivalents in this period. The GHG covered by the EA are process-based emissions of CO_2 and the perfluorocarbons CF_4 and C_2F_6. This EA is negotiated at the industry level, and only limits the GHG emissions of the industry, not single companies. The industry association is consequently left with responsibility to allocate emission reductions among individual companies. The EA states that the agreement is accepted conditional on changes in Norwegian climate policy and policy tools use, and also conditional on changes in responsibilities due to international agreements, such as the Climate Convention.[19] In a press briefing from the presentation of the EA it is stated that the Government will consider direct regulations and taxes if the targets are not met. Furthermore we notice that the aluminum industry states that large investments are required to meet the targets, but that most of these are profitable.

Due to a short time-span and few EAs it seems premature to assess their success. It is also worth noting that some of the industries' interest in EAs the last years has been transferred to an increased interest in a domestic emission permit trading system for Norway, which presently is under exploration.

4.6 In sum

Even this brief survey of experiences with EAs in four OECD member countries serves to illustrate the large variety in the types of agreements that may be found under the label of environmental agreements. There is, for instance, large variations in the extent to which targets of environmental improvement are formulated in the agreements; the extent of negotiation between governments and industries actually preceding an agreement; the extent to which non-compliance is and can be sanctioned; and the extent to which the results of the agreements are monitored and related to a non-EA situation. A general impression from this brief survey is that the justification for EAs as a policy tool in environmental management lies in the sense of partnership and co-operation they can generate between governments/regulators and industries, rather than in their environmental effectiveness. It is only in a few cases that achievements beyond what is likely to have been achieved in a non-EA situation can be documented. This lack of (documented) environmental effectiveness reinforces emphasis on their supplementary nature; EAs should be employed only as a *supplement* to traditional policy tools in environmental policy, not as a replacement. Our

[19] Article 7 of the EA states: "Avtalen inngås med forbehold om endringer i norsk klimapolitikk, herunder virkemiddelbruken, av betydning for denne avtalen som følge av vedtak i Storting eller regjering, og med forbehold om endringer i forpliktelser i henhold til internasjonale avtaler, herunder endringer i eller tillegg til Klimakonvensjonen eller EØS-avtalen".

survey has also indicated, however, that the supplementary function of EAs in some cases may be difficult to maintain. In the German case, for instance, it is precisely the *avoidance* of traditional measures such as taxes and ordinances that motivate industries and businesses to initiate and participate in EAs. Thus, traditional policy tools have attained a dual function that seems difficult to combine: On the one hand, they are the instruments for regulating environmentally damaging behavior. On the other hand, they are used as sanctions in cases of non-compliance with EAs.

Lack of environmental effectiveness is partly due to a lack of documentation in the sense that regulators have in many cases where EAs have been employed, not been sufficiently concerned with developing baseline and reference scenarios upon which effectiveness and efficiency analyses can be based. Lack of environmental effectiveness may, however, also be a result of the framework within which EAs are negotiated and developed. For instance, if regulators do not participate in the process of setting targets for EAs, the agreement is unlikely to result in anything beyond "business-as-usual" (as illustrated in the German case).

The picture is modified by the Dutch experience with EAs. The main distinction to the US and German cases, is the Dutch integration of EAs within the context of the national environmental policy plans developed in 1989-90. This framework implied that EAs were developed as instruments for implementing national targets already set by the government. The government not only participated in the process of setting targets for EAs, EAs were developed in response to national targets set by the government. This implies that the level of ambition of EAs is not decided by the industries themselves, as in the German case, but by governments who also have to answer to their electorates. The agreements thus also have a better chance of getting achievements beyond business as usual. The higher degree of environmental effectiveness of the Dutch EAs may be attributed this feature. It should, however, also be emphasized that none of these EAs have been concluded, and that these evaluations of environmental effectiveness are based on intermediate results.

The question of participation in the development of EAs is also associated with a democracy argument. Several environmental NGOs have voiced concern that the negotiation of EAs often takes place in a process where central interests are not represented (FoE, 1995; Glasbergen, 1998; Grepperud, 1998). Many EAs are developed in negotiations between a limited number of partners, usually industry groups and regulators. The process is therefore, rather more closed than a traditional policy making process which is subject to parliamentary ratification (EEA, 1997a). Their criticism is that this mode of environmental policy making is undemocratic and may also lead to weak EAs. The strength of the democracy argument is reinforced, moreover, in cases where not even public authorities have been involved in the process of setting the targets for the EA.

5 Environmental agreements as an international policy tool – bilateral and regional agreements

5.1 Introduction

The traditional approach for handling international environmental problems is for the countries involved to negotiate a treaty. Governments, or their representatives, participate in the negotiations. If the negotiations are successful the government signs the agreement. Thereafter the agreement is presented to the parliament for ratification. Thus the principal parties to such agreements are the governments of the countries involved. A government is also the national regulator responsible for implementing the environmental policy domestically. The government might delegate all or parts of its authority in this respect to specific regulatory bodies. The regulator and the regulated industry are located in the same country. Let us now turn to two variants of international EAs: bilateral and regional EAs.

Given that a general understanding or agreement exists between two or more countries - could a regulator in one country then agree on an EA with an industry in another country? In this case a regulator from one country would implement an environmental policy in an industry situated in another country. The issue to be explored in section 5.2 is thus if bilateral EAs can be a favorable policy tool for implementing international environmental agreements, and eventually also for implementing national environmental policies that are not necessarily part of an international agreement.[20] Furthermore, we want to explore under what circumstances bilateral EAs could be favorable.

The other version of international EAs, namely a regional EA, is the topic of section 5.3. In this case a regional regulator, for instance a designated body of the European Community, establishes an EA with an industry in all the member states. Once more the issue is if such regional EAs can be a favorable policy tool, and if so, under what circumstances.

5.2 Bilateral environmental agreements

Let us consider a situation where a company in country A releases air pollutants that have harmful effects on society and nature in its own country and in neighbor country B. The government of country B wants to reduce the harmful pollution. A traditional approach would be for the government of country B to negotiate an agreement with the government of country A.[21] Then government A undertakes some measures to reduce pollution from the company, either through direct regulation or through providing incentives through taxing or other market-based policy tools. As part of the agreement there can be a financial transfer from government B to government A, or government A earning some benefits in other areas, for instance transfer of new technology. Finally the company can reduce its pollution through investment in a new, and likely more energy-efficient technology, through fuel switching, or through investments in cleaning technologies.

[20] Confer the classification of EAs in chapter 2.
[21] Hereafter called government A and government B.

The idea of a bilateral EA is that the government, or its dedicated regulator, makes a direct EA with the foreign company in this example. An obvious provision for such an EA is that there exits a general agreement, or at least an understanding, between the two governments. After all government A to some extent transfers some of its authority and jurisdiction to government B when the latter is allowed to negotiate and make direct agreements with the company.[22]

Some examples of bilateral EAs covering other pollutants than GHGs exist. Dunné (1996) mention that the city of Rotterdam in the Netherlands in 1991 signed agreements with a number of German chemical firms to curb their release of pollutants to the Rhine River.[23]

5.2.1 Implementation of a national environmental policy

If a country B is exposed to harmful pollution from a neighbor country A there is no policy tool directly available. Country B might negotiate an agreement with the government of country A and hope that the government has the willingness and capacity to control the emissions from the polluting company. However, if country A is relatively poor or its ability to implement an environmental policy through the central authorities limited, a bilateral EA might be a better alternative than a government-level agreement alone. As a point in case a financial transfer or transfer of some other benefit to the polluting company could be part of the bilateral EA, and would give the company stronger incentives to implement the treaty. A fundamental requirement for such an arrangement is that government A accepts some loss of authority vis-à-vis the company. Other potential benefits compared to a centralized agreement for the regulator in country B is better availability of information on costs and emissions from the company. Better information opens for more accurate and efficient monitoring and verification of measures undertaken by the company, and of the reduction of emissions. Transfer of financial or other benefits as part of the bilateral EA is likely to increase the influence of regulator B on the actual strategy and actions of the company. Furthermore, the closer relation between the regulator and company makes possible a more fine-tuned control strategy than otherwise possible, for instance in terms of choice of technologies. One related benefit for country B is making an integrated pollution control more accessible, whereby both GHG and local pollutants are controlled, confer section 6.2 below.

5.2.2 Implementation of an international treaty

So far we have been thinking in terms of implementing a national environmental policy in country B. However, under some circumstances a bilateral EA could also be relevant for implementing an international environmental treaty in another country. Again, if country A is poor or the control capacity of its government limited a bilateral EA could be favorable. In addition the international treaty is most likely weak in terms of targets, verification and sanctions in case of non-fulfillment of targets, and in this situation a bilateral EA could be a

[22] The same basic motives can be found in environmental aid programs, e.g. the Danish program in Poland, confer Löfstedt and Sjöstedt (1996). In this program the Danish government, and county and municipality authorities, have funded environmental projects in e.g. Polish municipalities, companies and universities. These environmental aid programs can be interpreted as a variant of bilateral EAs, but are not covered by this study.
[23] The parties to the EAs were VCI (The German Association of Chemical Industries), Duisburger Kupferhütte, Berzelius, Deutsch Giessdraht, and Ara Pro Rheno. In addition unilateral contracts that contain a warranty regarding the reduction of discharges by the industry were agreed with Sandoz, Rhône-Poulenc and Atochem (Dunné, 1996).

favorable supplement to the treaty.[24] Should one or more of these provisions be satisfied a bilateral EA between the regulator of country B and the polluting industry in country A could speed up the implementation of the international treaty. Once more monitoring and verification could be enhanced by a bilateral EA.

5.2.3 Benefits for the government of the polluting country

We have seen that a bilateral EA in some settings can be a beneficial option for the regulator of the country exposed to pollution. However, why should the government of the polluting company accept loss of authority over the company and a direct influence of a foreign regulator? As noted above part of the answer can be a financial transfer or transfer of other benefits, such as new and efficient technologies. In addition the host government can gain from reduced local or national pollution given that a more ambitious control policy is made possible through the bilateral EA. Some value is also likely to be attached to improving the government's ability to fulfil an international environmental treaty, where a well-funded bilateral EA could play a positive role.

Summing up, bilateral EAs is an interesting policy option for controlling pollution imported from neighbor countries provided that a foundation in terms of a general agreement can be negotiated at government level. Bilateral EAs can be part of a national environmental policy or a supplement to an international environmental treaty.

5.3 Environmental agreements at EU level

The Fifth Environmental Action Programme of the European Community, "Towards Sustainability" from 1992, gives emphasis to the principle of shared responsibility in environmental management and the need to broaden the range of policy instruments (EAP, 1992: 16/point 31; Dröll, 1996).[25] It is also recognized that "not only is industry a significant part of the (environmental) problem but it must also be part of the solution" (EAP, 1992: 14/point 19). In order to reinforce the dialogue with industry, member countries are encouraged, "in appropriate circumstances", to develop "voluntary agreements and other forms of self-regulation" (ibid.). This recommendation has, as we have seen above, been taken seriously by EU member countries; there are currently over 300 EAs in operation within the EU region covering a broad range of industrial sectors and branches.

While the increase in EAs at the national level since the late 1980s is remarkable, EAs at Community level are rare. To date, the European Commission has taken part in three agreements; two relating to the phasing out of chlorofluorocarbons (CFCs) and the labeling of detergents, and one more recent agreement with the European automobile industry to reduce CO_2 emissions from new passenger cars. The latter agreement will be discussed in more detail below.

[24] Due to the international order of sovereign states most international treaties are weak in terms of sanctions. Informal sanctions can, however, for example take the form of critique from other countries and establishment of trade barriers.

[25] EAP, 1992: Fifth Environmental Action Programme of the European Community, OJ No. C 138 of 17.05.1993.

The issue of public-private agreements at EU level raise a set of interesting questions, related both to the compatibility of this policy tool with the legal framework of the EU, and what impact the level of governance at which EAs are developed may have on their environmental effectiveness.

5.3.1 The legal basis for the EU Commission to be partner in EAs with industry

The EU takes action by legislation – in the form of regulations, directives or decisions – and the process for taking action is designed accordingly; as a legislative procedure. As discussed above (chapter 4), it is an essential feature of EAs that they do not constitute legislation. EAs serve their function best if they are designed to support and supplement legislation rather than replacing it (Glasbergen, 1998; see chapter 4). Thus we immediately see that the institutional and legal framework of the EU is not designed to employ this policy instrument (Ingram and Liefferink, 1998). The Commission is, however, entitled to "formulate recommendations or deliver opinions on matters dealt with in this Treaty, if it expressly so provides or if the Commission considers necessary" (Article 155 second indent of the EC Treaty, cited in Dröll, 1996). In this case, the "matter dealt with in this Treaty" is environmental protection (dealt with in Articles 130r,s,t). The agreements referred to above, therefore, take the form of recommendations which have Article 155 as their legal basis (Dröll, 1996: 6). It is the Council, however, which is the Community legislator, and there are limits to the rather wide Commission competencies established in Article 155. Article 130s states that the Council, in co-operation with the Parliament, "shall decide what action is to be taken by the Community in order to achieve the objectives referred to in Article 130r" (which deals with environmental protection) (Dröll, 1996: 6). "Action" here clearly refers to legislation in the form of regulations, directives or decisions (Dröll, 1996). The competency of the Commission to enter into agreements with industry is therefore ambiguous, at best.

There are ways to circumvent these legal barriers towards EAs at EU level, however. One could be that the Commission decides whether or not it can act on the basis of Article 155 and that the Council and the Parliament bring the case before the Court of Justice if they believe that the Commission has lacked the power to do so (Dröll, 1996). Another could be that the Council and the Parliament empower the Commission to recognize industry commitment on specific issues.[26] The latter procedure would, however, involve a risk that the final agreement (brought to the Council and Parliament in the form of a position) is rejected. Another risk would be that the Commission is unable to reach agreement with industry within the framework for the agreement given by legislator (Council and Parliament) (Dröll, 1996).

These aspects demonstrate fully that the development of EAs at EU level involves complex legal questions in this procedure which is designed for legislation rather than agreements and that "a wider use of agreements at Community level … requires a broader framework established by the Community institutions" (Dröll, 1996).

5.3.2 Possible implications for environmental effectiveness

The remarkable increase in the number of EAs since the late 1980s at the national level of EU member countries may indicate that there is an unused potential for EAs also at Community level (Dröll, 1996). This proposition prompts the question of what could be gained by

[26] For a more detailed account of these options, see Dröll, 1996.

developing EAs at this level of governance, or more precisely, what impact the level of governance at which EAs are developed may have on their environmental effectiveness.

The large number of EAs at the national level within the EU clearly represents a development towards a more decentralized environmental policy.[27] This development may be seen as a response to an enhanced skepticism towards supra-national intervention at the expense of national sovereignty (Collier, 1998). It may also be seen as a response to the emphasis on the principle of subsidiarity established in the new Treaty on European Union, particularly in combination with the principle of shared responsibility (EAP, 1992: 78).[28]

Barring the unresolved and general question of the environmental effectiveness of EAs as policy instrument (see chapter 4), the development of EAs at the national level may be associated with both positive and negative implications for their effectiveness. It has been suggested that the effectiveness of EAs may be linked to the political culture of the country in which they are developed (Meadowcroft, 1998; Skjærseth, 1998). The essence of this argument is that EAs may be more appropriate in a consensus-based political system (the Netherlands and perhaps Scandinavia) than in a political system at the opposite end of the cultural continuum characterized by individualism, confrontation and litigation (the United States) (Meadowcroft, 1998). Meadowcroft, for instance, maintains that, "it is no accident that the best known examples of co-operative management are to be found in the Netherlands, which has long served as an example of a consensus-based political system" (Meadowcroft, 1998: 38). It should also be pointed out, however, that the use of EAs within the context of a confrontational political culture also may contribute to reduce the sense of enmity between regulator and target groups and hence improve the climate within which policies are developed and thus enhance their political feasibility and effectiveness (see also chapter 4). The possible connection between political culture and the effectiveness of EAs implies nevertheless that "success for one type of [policy] tool in a specific country is no guarantee for success in another country" (Skjærseth, 1998: 10). This implies further, that the development of EAs at the national level has obvious advantages as compared to EAs developed at higher levels of governance (Community level). EAs at the national level will necessarily be formed by, and in accordance with, the political culture within which they are developed. This aspect may, for instance, represent one explanation to the large variation in the types of EAs found even within the EU.

A related aspect to this line of reasoning is the compatibility of EAs with national legislation. As discussed in chapter 4, EAs developed at one level of governance may be in conflict with legislation at another. Within countries, this situation may for instance arise in the interface between municipalities and the state. Thus, the decentralization of environmental policy associated with EAs may imply incompatibilities between levels of governance even within the borders of one nation. It is obvious, therefore, that the development of EAs at Community

[27] The extent to which the increase in EAs also represents a development towards deregulation is explored in Collier (1998).

[28] In the Fifth Environmental Action Programme of the European Community it is pointed out that Article A of the new Treaty, "refers to the process of creating an ever closer union among the peoples of Europe, *'in which decisions are taken as closely as possible to the citizen'*. On the basis of Article 3b of the new Treaty, the Community will take action, in accordance with the principle of subsidiarity, only if and insofar as the objectives of the proposed action cannot be sufficiently achieved by the Member States and can therefore, by reason of the scale or effects of proposed action, be better achieved by the Community" (EAP, 1992: 78).

level, particularly when agreements are made with cross-national unions of industries, may be incompatible and in conflict with national legislation. This would generate uncertainty and ambiguities regarding the legal status of the agreements that could seriously undermine their environmental effectiveness. This argument goes both ways, however. EU member countries are also committed to EU legislation, and incompatibilities similar to those we have found between municipalities and the state may be generated in the interface between national and Community legislation.

The decentralization implied by the large number of EAs developed even at the lowest possible level of governance is inevitably linked to a reduced potential for harmonization of policy instruments within the EU. This may imply that international and transnational industries may be confronted by a complex web of private and public law which also may affect the actual cost-effectiveness of the agreements (measured in terms of total costs). While the costs associated with the implementation of a specific policy may be reduced for each unit or branch of an industry through national EAs, it is not inconceivable that this decentralization also may incur costs, which could have been avoided had the agreements been developed at a higher level of governance, and which may undermine the cost-effectiveness of the agreements. The decentralization associated with EAs may also imply that industries are confronted with larger variations in market, and hence competition conditions. The weight of this argument would, however, also depend on the extent to which behavior regulated by EAs also is regulated by Community legislation, in which case the decentralization effect (on the harmonization of policies) could be counterbalanced.

Herein also lies the perhaps most important potential gain associated with the development of EAs at Community level. Cost-effectiveness is inevitably linked to level of governance since it may be seen as a function not only of the ability and flexibility to employ the cheapest measure to obtain a desired objective, but may also be seen as a function of the ability to co-ordinate behavior at the highest possible level. The harmonization of environmental policies and the “leveling-out of the playing field” this could imply for European industries, could in itself represent a potential for profitability and reduced costs. The administrative costs (for industries as well as for governments) associated with the development of EAs should also not be underestimated. A more centralized negotiation process could therefore represent a source to a significant reduction in administrative costs as well.

A crucial factor for the effectiveness of EAs is that the number of participants allows for a manageable negotiation process (Dröll, 1996). A necessary condition for the development of EAs at community level is, therefore, that industries are organized in cross-national associations or federations that are empowered to negotiate on behalf their members. The extent to which these cross-national associations of industries include all major actors would also affect the effectiveness of the agreements in which they are partners. To the extent that major businesses, branches or companies are not members of the association and hence not partners to the agreements, the potential of free-riding is exacerbated and thereby also the potential for ineffectiveness.[29]

To the extent that EAs are meant to be supplementary to legislation, the level of governance at which EAs are developed must correspond to the level of governance of the legislation which

[29] For a discussion of the problem of free-riders, see, for instance, Glasbergen, 1998; FoE, 1995; EEA, 1997a,b.

regulates target group behavior. If target group behavior mainly is regulated by legislation at the national level, EAs to supplement this legislation also need to be developed at this level of governance. If, on the other hand, target group behavior mainly is regulated by legislation at Community level, EAs also need to be developed at Community level to ensure the best possible legislative compatibility. The extent to which EAs can and do supplement rather than replace legislation is, however, questioned, since the *avoidance* of legislation often is a main motivation for industry to participate in the development of EAs, and the threat of legislation often is used as a sanctioning mechanism for non-compliance (Bergmann et al., 1998).

The need to correlate level of governance at which EAs are developed with the level of governance of legislation regulating the activity in question nevertheless points to the supplementarity of EAs at national and Community level: the question of which level of governance EAs should be developed will seldom be a question of either-or. Rather, it is a question of finding the most appropriate policy tools developed at the most appropriate level of governance depending on the nature of the issue in question. This point is also elaborated in the Fifth Environmental Action Programme of the European Community:

> "Since the objectives and targets put forward in the Programme and the ultimate goal of sustainable development can only be achieved by *concerted* action on the part of all relevant actors working together in partnership, the Programme combines the principle of subsidiarity with the wider concept of *shared responsibility*. This latter concept involves not so much a choice of action at one level to the exclusion of others but, rather, a mixing of actors and instruments at the appropriate levels, without any calling into question of the division of competencies between the Community, the Member States, regional and local authorities. For any one target or problem, the emphasis (actors and instruments) could lie with the Community/national/regional government level and for another with the regional/local/sectoral level or at the level of enterprises/general public/consumers." (EAP, 1992: 78).

There may be significant advantages associated with the development of EAs at Community level, particularly in terms of harmonization of policy instruments and the implications this may have for market and competition conditions for European industries, as well as in terms of the potential for cost reductions that may lie therein. It is also clear, however, that a wider use of EAs at Community level would require a change in EU institutions. Given the current ambiguity with regard to the actual environmental effectiveness of this policy instrument, it might be wise to await further documentation of effectiveness in general and conditions for effectiveness in particular, before embarking upon such a process of institutional change.

5.4 The agreement between the European Commission and the European automobile industry

On 29 July, 1998, after almost two years of negotiations, the European Commission and the European Automobile Manufacturers Association (ACEA) finalized an agreement according to which automobile manufacturers are committed to reduce CO_2 emissions from new

passenger cars by 25% between 1995 and 2008. This implies that new passenger cars sold on the European market on average can emit no more than 140 g CO_2/km in 2008.

While the agreement is hailed by the commissioner for industry, Martin Bangemann, as a "landmark achievement" (GECR, 14 August, 1998; Press release from DG XI of 29 July, 1998), the agreement nevertheless implies that it is highly unlikely that the EU will achieve its political objective of getting average CO_2 emissions from new passenger cars down to 120 g/km by 2010 at the latest (GECR, 14 August, 1998).[30] The agreement implies, however, that the group is committed to ensure that some producers will market car models that emit 120 g/km or less by 2000. ACEA members include BMW, Fiat, Ford of Europe, GM Europe, Daimler-Benz, Porsche, PSA Peugeot Citroën, Renault, Rolls-Royce, Volkswagen and Volvo (GECR, 14 August, 1998).

The commitment of ACEA is based on a set of assumptions which, "reflect the fact that the automotive industry's ability to attain its CO_2 objective may be affected by developments outside its control" (EC Communication of 06.11.98).[31] More specifically, the assumptions relate to:

1. *Fuel quality*; ACEA's commitment is based on "the requirements resulting from the conciliation procedure between the Council and the European Parliament on 29.6.98 [the Auto Oil Program], notably the maximum sulfur specifications of 50ppm in petrol and diesel and the maximum aromatic content for petrol of 35%";[32]
2. *Distortion of competition*; The commitment assumes that there are no distortions of competition which disfavor the European manufacturers due to their efforts to reduce CO_2 emissions;[33]
3. *Diffusion of fuel-efficient technologies*; the commitment assumes an unhampered diffusion of fuel-efficient technologies into the market;
4. *Impacts of the strategy on the general economic situation of the European automobile industry*, which are assumed to be taken into account (EC Communication of 06.11.98).[34]

In the communication it is pointed out that, "the Commission has no reason to believe that the assumptions will not be borne out, and therefore it should not be necessary to review the agreement at any stage" (EC Communication of 06.11.98).

An important aspect of the agreement is that the CO_2 reduction mainly is to be achieved through technological improvements. This is important to the Commission since it leaves

[30] DG XI press release of 29 July, 1998: "Commissions and ACEA agree on CO_2 emissions from cars", IP/98/734. Internet site: *http://www.europa.eu.int/en/comm/dg11/press/98734.htm*.
[31] The agreement is presented in COM(1998)495 final. The document cited here is, Communication from the Commission to the Council and the Parliament: "An Environmental Agreement with the European Automobile Industry" found at internet site: *http://europa.eu.int/comm/dg11/co2/co2_comm.htm.*
[32] COM(96)248 final. See internet site: *http://europa.eu.int/en/comm/dg17/autooil.htm.*
[33] In practice, this assumption implies that similar agreements are made with non-ACEA manufacturers. The Commission is currently seeking to conclude negotiations with the Japan Automobile Manufacturers Association (JAMA) and the Korean Automobile Manufacturers Association (KAMA). See internet site: *http:///europa.eu.int/comm/dg11/co2/co2_agre.htm.*
[34] See also "ACEA Commitment on CO_2 Emission Reductions from New Passenger Cars in the Framework of an Environmental Agreement between the European Commission and ACEA". Internet site: *http://europa.eu.int/comm/dg11/co2/co2_acea.htm.*

room "for changes in the market, such as a consumer-led shift toward smaller cars, to be introduced by tax measures and fuel-economy labeling" (GECR, 14 August, 1998). Such measures could, according to the Commission, help bridge the gap between the reduction target of the agreement (140 g/km) and the official target of the EU (120 g/km). Initially, the ACEA strongly opposed an admission for governments to introduce tax measures to push average CO_2 emissions below the 140 g/km target. This point represented the final "sticking point in the negotiations and risked endangering the entire agreement" (GECR, 14 August, 1998). Language to this effect is, however, included in the agreement, for instance under assumption 3) above where it is pointed out that, "it is the Commission's and ACEA's common understanding that this does not restrict the Community's and Member States' freedom to use fiscal measures or regulatory measures". GECR reports, however, that "an ACEA spokesman made clear that, despite the revised wording of its commitment, the auto industry remains opposed to the use of tax measures" (GECR, 14 August, 1998).

The agreement establishes a monitoring procedure that is administered jointly by the ACEA and the Commission. The monitoring mechanism will give particular scrutiny to the assumptions underlying the ACEA commitment. The procedures for this joint monitoring mechanism are to be laid down in an exchange of letters between the ACEA and the Commission. In addition, the Commission has presented a proposal for a Community monitoring system independent of the agreement with ACEA (COM(1998)348).[35] The monitoring of average CO_2 emissions from new passenger cars will be based on data from Member States independent of industry data. These two monitoring systems will, "in the Commission's view, together provide an effective instrument for the monitoring of the Agreement and a basis for a broader co-operation between both sides in the area of CO_2 emissions from passenger cars" (EC Communication of 06.11.98).

The agreement includes an "estimated target range" of 165-170 g CO_2/km for 2003. While this intermediate target is "of a purely indicative nature", the Commission nevertheless attaches importance to this target as a basis for verification of the agreement's effectiveness: "the Commission would thoroughly review the Agreement should ACEA fail to achieve its target range in 2003, and consider drawing up a proposal for binding legislation" (EC Communication of 06.11.98). Legislation, therefore, is the sanctioning mechanism that would be applied in a case of non-compliance.

The development of intermediate targets is a response to the guidelines for EAs developed by the Commission (COM (96)561). It is also a response to the concern expressed by the European Parliament, who is not overly enthusiastic about EAs (see below).

The terms of the agreement are meant to correspond to the Commission's original objectives as set out in COM(95)689 and take account of the general criteria for EAs contained in the Commission's Communication on Environmental Agreements (COM(96)561). The agreement takes the form of; a commitment formally adopted by the board of ACEA; a Recommendation subsequently adopted by the Commission; and (concerning practical implementation) an exchange of letters between ACEA and the Commission (EC Communication of 06.11.98). The terms of the agreement are presented to the Council and the Parliament in COM (1998)495 final.

[35] See internet site: *http://europa.eu.int/comm/dg11/co2/co2_moni.htm.*

The Council's response to this Communication is generally positive: The Council "supports the Commission's intention to conclude an environmental agreement with ACEA on CO_2 emission reductions from new passenger cars on the basis of the commitment of ACEA of 27 July"; "welcomes the objective of the agreement…"; "is satisfied that the agreement is designed to make the major contribution to the achievement of the CO_2 emissions objective of the Community strategy…"; while it also "notes that the agreement does not compromise the right of the Community and Member States to exercise their competence as regards fiscal and other measures"; and "confirms the necessity to consider further measures that will be required in order to achieve the objectives of the Community strategy" (Council conclusions of 06.11.98).[36] The European Parliament, on the other hand, expresses much more skepticism towards this policy instrument in general and towards this agreement in particular. In its resolution, the Parliament notes that the communication from the Commission and the commitment of ACEA "do not provide any satisfactory answer to a number of urgent questions which are vital for successful implementation". These urgent questions include arrangements for the continuation of the commitment should one or more of the assumptions upon which ACEA's commitment is based not hold true; that the "estimated target range of 165-170 g CO_2/km is too imprecise a criterion"; and that the future arrangements for a monitoring system "to be agreed through an exchange of letters between the Commission and the ACEA cannot be regarded as adequate".[37] The resolution also "stresses that the proposed commitment by ACEA cannot dispel the fundamental doubts as to the effectiveness of voluntary agreements which Parliament has expressed on numerous occasions" (ibid.). The European Parliament concludes that it "can accept the procedure announced by the Commission in its communication only on condition that the above open questions are satisfactorily resolved in the negotiations with ACEA and the other associations" (ibid.). Despite this rather strong language, the agreement is expected to be accepted by the Parliament (EU Executive to GECR, 14 August, 1998).

[36] "Council Conclusions on the Commission Communication 'Implementing the Community strategy to reduce CO_2 emissions from cars: an environmental agreement with the European automobile industry'", internet site: *http://europa.eu.int/comm/dg11/co2/co2_coun.htm*

[37] "Parliament's Resolution on climate change in the run-up to Buenos Aires (November 1998)", internet site: *http://europa.eu.int/comm/dg11/co2/co2_reso.htm* dated 06.11.98.

6 The role of environmental agreements in the implementation of the Kyoto Protocol

6.1 Introduction

The Kyoto Protocol establishes the so-called Kyoto Protocol mechanisms Joint Implementation (JI), Clean Development Mechanism (CDM), and Emissions Trading (ET).[38] These mechanisms open up an international market for GHG quota trading. Countries that have cheap quotas to sell can make a profit from selling these, and countries that have to resort to expensive domestic measures can save costs through buying some quotas on the international market. Not enough countries to make it enter into force have yet ratified the Kyoto Protocol. However, with the expectation that the Kyoto Protocol will enter into force in a few years, the relation between international EAs and the Kyoto Protocol mechanisms becomes an interesting issue. Can EAs be an alternative or supplement to the Kyoto Protocol mechanisms for countries that collaborate to reduce their emissions of GHG?

Let us explore the relationship between EAs and the Kyoto Protocol mechanisms through the two notions "identifiability" and "market size".

By "identifiability" of quotas we mean the extent to which the quotas are linked to specific investment or projects or not. In the case of JI and CDM the quotas are linked to specific projects where a country or company co-finance an investment that contributes to reducing emissions of GHG. Alternatively, the host country or company develops the investment project and sells quotas to the highest bidders in an auction. Such quotas may be traded in a second-hand market, but are principally not papers that are guaranteed by the state in the host country. They can rather be understood as shares of the specific investment project. In the case of ET a company can buy quotas on an international market, where the quotas are guaranteed by the state of the selling country.[39] Given this situation the buyer needs not worry about the origin of the quotas, or at least would have to worry less that in the case of JI and CDM. Thus we can claim that the identifiability of ET is smaller than that of JI and CDM, see Figure 1.[40] In this perspective EA is similar to JI and CDM, with a high degree of identifiability. Like JI

[38] Article 6 in the Kyoto Protocol concerns Joint Implementation, whereas Clean Development Mechanism is described in Article 12, and Emissions Trading in Article 17, confer e.g. CICERO's internet site at: http://www.cicero.uio.no/CICERONE/98/2/kyotoprotokollen.pdf.

[39] The rules for emissions trading and the other Kyoto Protocol mechanisms remain to be developed and negotiated. According to the work plan adopted at the Conference of the Parties to the UNFCCC in Buenos Aires in November 1998 rules should be adopted at the Conference of the Parties in November 2000. One of the issues to be determined is the distribution of liability between the seller country and the buyer country. Some type of shared liability is the most likely outcome. If all liability for the quotas should remain with the seller country and guaranteed by the state, the buyer company (or country) would not have to worry about the origin of the quotas, i.e. how the emissions abatement is generated. The situation is somewhat more complicated if the buyer country (or company) has part of the liability. In this case the buyer could be concerned with the origin of the quotas as a quality control and precaution to reduce the risk of non-delivery or reduced delivery of emissions abatement.

[40] A further distinction between JI and CDM on the one hand and ET on the other hand, is that the former is credits-based whereas the latter can be allowance-based or credits-based. By credits-based we mean that the transfer of quotas is done *ex post* founded on verified emission reductions. Allowance-based quota transfer is *ex ante* founded on allowances that are allocated to all the trading agents, these being companies or countries. Since the rules for international ET remains to be settled we do not know if they will be based on credits or allowances, even if the allowance-based variant seems most likely.

and CDM, EAs are linked to specific companies and projects, where a major objective is the reduction of GHG emissions.

Turning now to the second notion, market size, the policy tools we are discussing constitutes three different levels. International ET is likely to constitute the largest market, even if trading is limited to countries with legally binding targets according to the Kyoto Protocol, in other words the industrialized world (i.e. the Annex B countries defined in the Kyoto Protocol). JI and CDM quotas constitute the intermediate level. Like ET, JI is also limited to the industrialized world. Due to the linking of JI quotas to specific projects a market for such quotas is likely to be smaller than the market for ET quotas. The reason for this is the higher identifiability of JI quotas that implies that such quotas could have specific features attached to them, in particular different risk profiles, and consequently earn different prices per ton of carbon dioxide equivalent. In such a market the buyers (and sellers) would need to consider not only the volume and price, as in the case of ET, but also consider any other important features of the quotas. Thus the transaction costs in the JI market would be significant higher than in the ET market. CDM, that is constrained to quota buyers within the industrialized world and sellers among developing countries (i.e. non-Annex B countries), is likely to have a similarly market size to that of JI. The CDM market might be somewhat larger than the JI market due to its global coverage. On the other hand one can expect additional transaction costs attached to CDM quotas since there may be more uncertainty related to quota-generating projects in developing countries than in industrialized countries. Furthermore, the Kyoto Protocol states that some of the invested money must cover administrative costs and contribute to covering adaptation costs of the developing countries most vulnerable to climate change.[41]

[41] Confer Article 12, paragraph 8, of the Kyoto Protocol: 'The Conference of the Parties serving as the meeting of the Parties to this Protocol shall ensure that a share of the proceeds from certified project activities is used to cover administrative expenses as well as to assist developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation'. This provision can be interpreted as a fee on CDM projects. In the case of ET and JI no such provision is mentioned in the text of the Kyoto Protocol.

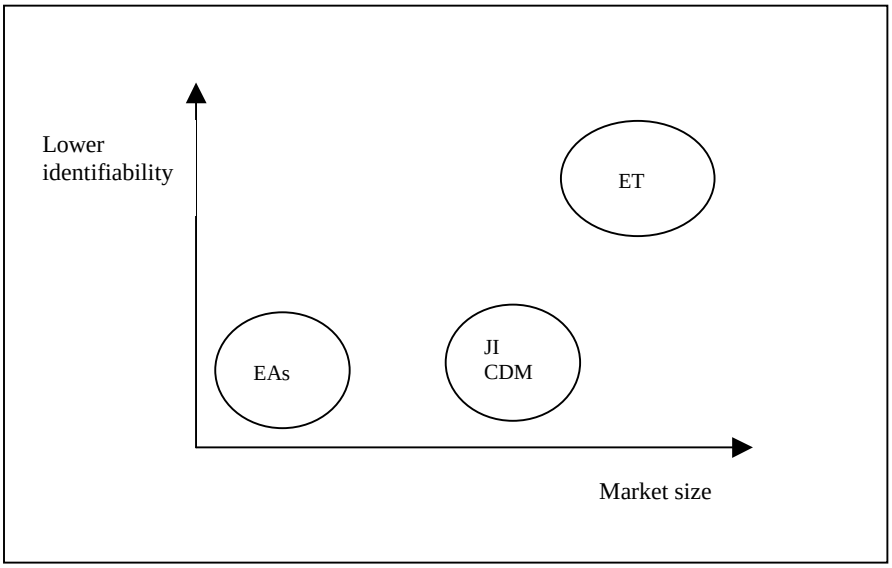

Figure 1: Comparison of EAs and the Kyoto Protocol mechanisms with respect to market size and identifiability of quotas (ET = Emissions Trading; CDM = Clean Development Mechanism; JI = Joint Implementation; EAs = Environmental Agreements).

The third level is constituted by EAs, where there is no market involved. In many respects JI quotas are similar to EA quotas, but the vital difference being that EAs are based on contracts between a company (or industry) and a regulator, so that quotas saved by the company through for instance energy efficiency improvements cannot be sold to other companies.

The relation between these policy tools in terms of identifiability of quotas and market size is shown in Figure 1. The figure shows that the big difference in terms of identifiability is between ET on the one hand and JI/CDM and EAs on the other hand. In terms of market size the three levels from a non-existing market in the case of EAs to a large market for ET is also shown.

Let us elaborate further on linking EAs to the Kyoto Protocol mechanisms through employing the two dimensions geographical scale and extent of trading involved. By geographical scale we think of a scale from domestic, over bilateral, regional and international to global. By extent of trading we discriminate between EAs, where no trading is involved, and ET, where an international market could be in operation. Figure 2 illustrates these relations.

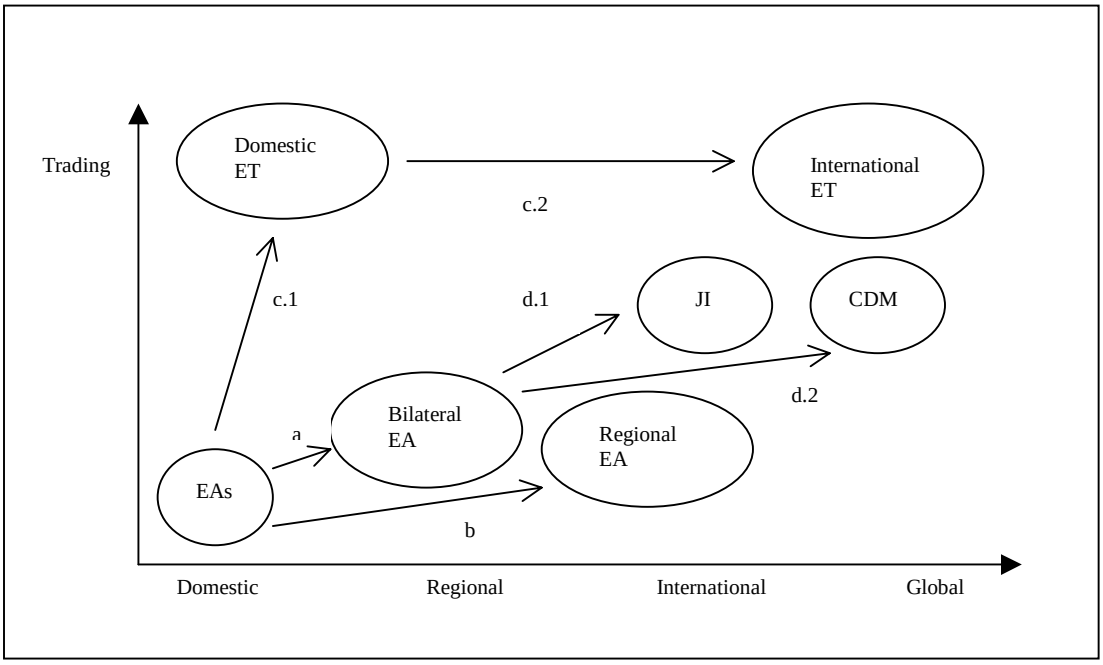

Figure 2. Different options for international Environmental Agreements and linking to the Kyoto Protocol mechanisms.

Along the horizontal geographical scale axis we move from domestic EAs at the left to CDM and international ET at the far right.[42] Along the vertical axis we move from non-tradable EAs at the bottom to ET at the top. The figure illustrates that there are basically three ways of making EAs international and eventually linking them to the Kyoto protocol mechanisms:

a) Moving from domestic EAs to bilateral EAs, and further on to JI (denoted d.1 in the figure) or CDM (denoted d.2 in the figure);
b) Moving from domestic EAs to a regional EA; and
c) Using domestic EAs as a "stepping stone" to domestic ET (denoted c.1 in the figure) and further on to international ET (denoted c.2 in the figure).

In the rest of this chapter these three options are further explored.

6.2 Environmental agreements and joint implementation

Since bilateral EAs were discussed in section 5.2 above we now focus on the possible linkage between bilateral EAs and JI.[43] In this context the differences between JI and CDM are not important, so we limit the discussion to JI. Furthermore we simplify the analysis by considering the JI type that comes closest to an EA between a regulator and a company in another country. Thus we focus on JI project where the investor is the government of a state,

[42] By domestic EA we understand a standard EA between a national regulator and a company or industry in the same country.
[43] An exploration of the JI mechanism can be found in Torvanger et al. (1994).

and the host is a company in another country.[44] This is a special case of typical JI arrangements since most JI projects are likely to by funded by business. However, in the present JI pilot phase ('Activities Implemented Jointly' (AIJ)) there are projects partially funded by governments. The question we really want to answer is if bilateral EAs can be a supplement or alternative to JI. Let us first consider the main similarities and differences between these two policy tools. Both tools are based on a contract between the regulator of a country and a company in another country. For example, the regulator invests some amount of money in a project that improves the energy-efficiency level of the company's production process. In the case of an EA some other benefits than a money transfer to the company may be involved, for instance transfer of technology. Another difference is that an important benefit of an EA for a foreign regulator is likely to be reduced emissions of local or regional pollutants like NO_x and SO_2 that are harmful also to his country. In addition reduced emissions of GHGs could be a consequence of the EA. In the case of JI the only benefit involved for the foreign investor/regulator is reduced emissions of GHGs, for instance CO_2, where the regulator receives a credit that is allowed to count against his Kyoto Protocol GHG emission reduction commitment.

On this background, let us discuss three potential advantages of bilateral EAs compared to JI.

EAs as part of learning process.
Since there are some important similarities between a bilateral EA and JI, an EA established in an early phase could serve as part of a learning process. Through a bilateral EA the regulator gains experience that should be valuable at a later stage should he aim for a JI contract with the same company. This experience would be particularly valuable if the knowledge of local conditions is limited, and if there are sizeable uncertainties related to the company and its surrounding municipality, in particular related to economic, political and social conditions. The EA project could also serve a learning process within the company and improve its performance on reducing emissions. Consequently the value of a later JI project involving the company can be increased. In this way an early EA could serve as a "stepping stone" for a JI project. At a later stage the EA could potentially be expanded to a JI project and in this way serve as a "pilot JI project".

JI is not yet made operational.
The JI mechanism is not yet made operational. Thus an EA could be attractive if it can be established in a relatively short time. It can still take some years until the Kyoto Protocol enter into force and rules for JI are developed. We are presently in a pilot phase for JI, Activities Implemented Jointly, but there is no crediting of emission reductions involved, and the pilot phase is scheduled to end by year 2000.

The objective is primarily reduction of emissions of local and regional pollutants.
JI projects are concerned with reduction of GHG emissions. By establishing EAs the regulator can aim at reducing local and regional pollutants like SO_2 and NO_X. In this perspective bilateral EAs and JI are supplementary policy measures.

On this background an attractive idea is to combine a bilateral EA and JI. Taking an energy-efficiency-increasing project in a Russian company, where coal is the major energy source, as

[44] Confer also environmental aid programs mentioned in footnote 22.

an example, the objective of the EA would be to reduce emissions of SO_2 and NO_X, whereas the objective of the JI contract is to reduce emissions of CO_2. In this manner a joint product or package of reduced emissions of GHGs and other pollutants to air could be an attractive option. There is likely to be some "economics of scale" effects involved in such a joint project, confer the discussion of limited knowledge and uncertainties above. Furthermore, in many investment options in GHG abatement there is a by-product in terms of reduced emissions of local air pollutants, confer Aaheim, Aunan and Seip (1999). The other way around, most projects to reduce emissions of local air pollutants have a by-product in terms of reduced emissions of GHGs. Thus, a bilateral EA could serve to supplement JI in an efficient manner in such a "EA and JI package".

One of the challenges of such EA and JI packages is to satisfy the forthcoming rules for JI credits. The JI rules are likely to specify a number of provisions for documentation of emission reduction effect to grant credits for investments in JI projects. These rules constitute the foundation for monitoring, verification and certification of abatement effects. Consequently the same JI rules must to some extent also be satisfied for the EA-part of an EA and JI package. If the JI rules are relatively strict this might imply less flexibility for the design of such EA projects. Secondly, since JI rules are focussed on GHG emissions they might be less well suited for local and regional pollutants like NO_x and SO_2.

6.3 Environmental agreements and emissions trading

In this section we explore if EAs can serve as in intermediate step towards ET.

6.3.1 Environmental agreements as an intermediate step towards emissions trading

As we have noted earlier, there are some similarities between EAs and quotas in a domestic ET system. However, a major difference is that the quotas defined by an EA cannot be traded whereas trading is a vital feature of an ET system. This observation rises the issue whether EAs could be an intermediate step towards a full-blown quota trading system. In terms of an international ET system, this transformation could be taken in two steps. First from domestic EAs to a domestic ET system, confer c.1 in Figure 2, and then from a domestic ET system to an international ET system, confer c.2 in Figure 2. In this study we are only concerned with the first step at the domestic scene. Let us explore some requirements that should be satisfied if EAs are to be transformed into quotas in a domestic ET system. Obviously, this idea is more interesting in countries where a large share of companies and industries today have EAs, as compared to a country where for instance only one industry has an EA.

Two scenarios are considered. In the first and simplest scenario all companies have EAs before the quotas are made tradable. In the second, and probably most realistic scenario, some share of the companies have EAs whereas the remaining companies have to pay a carbon tax. When the domestic quota trading system is introduced the companies with EAs have their "quotas" made tradable. All quotas defined by the EA could be made tradable, or only some fraction of these. The tax-paying companies can replace taxes with quotas that are bought through an auction, if the quotas are cheaper than the tax.

In the first scenario all companies are exposed to the same environmental regulations, so the issue is not “level playing field” but how EA quotas could be transformed into tradable quotas in a domestic ET system.

Since EA contracts imply some type of free quotas an important question is if the company is allowed to keep all its quotas for free when they are transformed to ET quotas. For EA to serve as a “stepping stone” to tradable quotas at least some of them must be kept for free. If all ET quotas had to be bought the linkage between the two regulation systems would be weak. If the company needs more than the free quotas the rest could be bought through an initial auction organized by the regulator, or eventually bought on the second-hand market for quotas. In any case the regulator must decide on the total GHG emission target, and thus the total number of quotas. It is realistic to assume that the regulator reduces the total number of quotas as the ET system is established, as part of more ambitious emission reduction targets in the future.

Another issue that needs consideration is the validity period of tradable quotas compared to the EA. If the EA period is relatively long, for instance lasting until 2010, the regulator and companies need to negotiate a soft transformation period, given that the first Kyoto Protocol target period is 2008-2012. This would particularly be the case if the companies get fewer quotas than implied by the EA for the last part of the period 2208-2010. Furthermore, a domestic ET system could easily end up with quotas of a shorter validity period than traditional EAs, for instance 1 year or 2 years. A related issue is saving of quotas. If a company is able to reduce its emissions by more than prescribed by the EA, should it then be allowed to save quotas, or some part of them, for later use in an ET system?

Moving on to the second scenario, a specific question is handling of free quotas with respect to the two groups of companies. We assume that the regulator’s policy is to avoid a widening difference among the groups with respect to equal market conditions and environmental regulations, in other words a “level playing field”. To avoid increasing the distance to the ideal of a “level playing field” situation between the two groups of companies, some share of the quotas could be given for free to the earlier tax-paying companies. Then both groups of companies would get some quotas for free, and had to buy the remaining quotas they need, initially through an auction organized by the regulator, or later in the second-hand quota market.

6.4 In sum

In sum we find that EAs can play an important role in a transition phase from established policy tools, and in particular command and control, to a Kyoto Protocol regime of emissions trading, joint implementation, and CDM. Thus the emission permits defined by EAs can later be made tradable at a domestic emission trading market, which later could be part of an international emission trading regime. In this manner national EAs could be a ‘stepping stone’ to full-fledged international emission trading. Alternatively, bilateral EAs could be combined with or develop into joint implementation, or possibly CDM projects.

7 Conclusions

Five main conclusions to be drawn from this study are:

1) Experience with Environmental Agreements in a number of OECD countries suggests that these agreements are most attractive as a supplement to traditional command and control, or to market-based policy tools. This finding is also supported by the academic literature.

2) The academic literature indicates that skillful design of Environmental Agreements can improve their efficiency, for instance through including a menu of contracts (i.e. agreements) the company can choose between, or through the introduction of subsidies in case of over-fulfillment combined with a tax in case of under-fulfillment of the target.

3) Bilateral Environmental Agreements is an interesting policy option to regulate pollution from other countries, provided a general agreement between the two governments is established.

4) Regional Environmental Agreements are rare, even within the European Community, but could have important advantages and be an interesting supplement to other policy tools.

5) Environmental Agreements can play a role as a 'soft' transition stage from traditional command and control to domestic emission trading, and further on to a Kyoto Protocol regime of emission trading and joint implementation.

In terms of the first main conclusion a large variety of EAs is found in a number of OECD countries. Given their undocumented environmental effectiveness, it is odd that EAs have gained such a widespread recognition by governments as an instrument for environmental management. The lack of environmental effectiveness is partly due to a missing specification of baselines and reference scenarios to which the GHG abatement effect is compared and measured, but also due to the fact that regulators do not always participate in setting targets for EAs. Another concern is that the EA negotiation process in many cases is closed for third parties, and consequently more closed than a traditional policy making process in many countries. Such a closed process is undemocratic and can lead to weak EAs. The popularity of EAs may, however, lie in their political feasibility. With the negotiation of EAs, arenas for dialogue, partnership and co-operation between governments and industry have been established. For the industry, EAs are seen as a tool for enhanced predictability in environmental regulation. For governments, EAs may be seen as a tool for a more rapid behavioral change towards environmental accountability within industrial sectors than what is possible in case traditional policy tools are employed. In the long run, however, the societal legitimacy of this instrument will depend upon its demonstrated environmental effectiveness as well as the transparency and openness of the process in which it is developed. Due to these potential advantages of EAs but their undocumented environmental effectiveness, EAs seem most attractive as a supplement to other policy tools.

In terms of the second main conclusion the academic literature on EAs is limited. The literature does not give clear indications of whether EAs should be preferred to other policy tools, but claim that EAs have some potential benefits that can be harvested under some, but

likely not the majority of, circumstances. Thus more and broader studies are required to give clear recommendations on the circumstances where EAs should be preferred to traditional command and control and market-based instruments. However, EAs may work well as a supplement to other policy tools under a wider set of circumstances than employing EAs alone.

Studies based on principal-agency theory have shown that menu-based EAs could be an interesting policy tool alternative in a situation of asymmetrical information between regulator and companies. Such EAs can do better than tradable permits and taxes in terms of welfare effects. This conclusion is based on a model where the survival of a specific company (or industry) is a vital constraint. Also of importance is the administrative cost of EAs compared to other policy tools. The administrative cost is likely to be reduced if the EA is negotiated with an industry federation instead of single companies. However, this could mean a heavier administrative burden on the industry federation.

If EAs are analyzed in an incomplete contract framework one tentative conclusion is that there is some potential for designing EAs in a way that reduces the problem of too lax targets for GHG abatement in companies and industries in EA contracts. One solution can be to introduce a subsidy in the case of over-fulfillment of the target, and a tax in the case of under-fulfillment of the target. Another suggestion from such models is that a shared investment in GHG abatement technologies between the regulator and companies is helpful in this context. As a case in point there are likely benefits for the companies in terms of improved energy-efficiency if investment is made in technologies that reduce GHG emissions. Finally, third parties like NGOs or representatives from the local community can play a helpful role in the negotiations and monitoring process of an EA to ascertain targets that are ambitious enough to be welfare-increasing. Through further analyses in an incomplete contract framework more insights can be gained into the efficient design of EAs.

In terms of the third main conclusion a bilateral EA is defined as a case where a regulator in one country negotiates an EA with a company or industry in another country. Bilateral EAs can be part of a national environmental policy or a supplement to an international environmental treaty. One example of bilateral EAs is the agreements from 1991 between the city of Rotterdam in the Netherlands and a number of German chemical firms to reduce pollution to the Rhine River.

In terms of the fourth main conclusion a regional EA is negotiated between a regional regulator and one or more industries in a group of countries. We have surveyed EAs at European Community level, but find that such agreements are rare. To date there are three agreements of this kind, of which one is with the European automobile industry to reduce CO_2 emissions from new passenger cars. There may be significant advantages associated with the development of EAs at Community level, particularly in terms of harmonization of policy instruments and the implications this may have for market and competition conditions for European industries. Consequently regional EAs could more or less counteract the decentralization and de-harmonization drive associated with a large number of national EAs in EU member states. In addition there may be a potential for cost reductions attached to regional EAs. It is also clear, however, that a wider use of EAs at Community level would require a change in EU institutions. Given the current ambiguity with regard to the actual environmental effectiveness of this policy instrument, it might be wise to await further

documentation of effectiveness in general and conditions for effectiveness in particular, before embarking upon such a process of institutional change.

In terms of the fifth and final main conclusion EAs can play an important role in a transition phase from established policy tools, and in particular command and control, to a Kyoto Protocol regime of emissions trading, joint implementation, and CDM. Thus the emission permits defined by EAs can later be made tradable at a domestic emission trading market, which later could be part of an international emission trading regime. In this manner national EAs could be a ‘stepping stone’ to full-fledged international emission trading. Alternatively, bilateral EAs could be combined with or develop into joint implementation, or possibly CDM projects.

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