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The use of negotiated environmental agreements:

from gentlemen's agreements to binding contracts

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The use of negotiated environmental agreements: from gentlemen's agreements to binding contracts

Abstract. The first negotiated environmental agreements that emerged in the policy arena were characterised as legally unbinding gentlemen's agreements containing only vague targets, little provisions concerning monitoring and hardly any sanctions in case of non-compliance. This has brought about much criticism towards the effectiveness and legality of negotiated agreements as a policy instrument and has lead to the development of guidelines concerning the use of environmental agreements by policy makers. These guidelines stress the importance of signing binding agreements with stringent enforcement provisions. Whereas these guidelines were introduced with the aim to stimulate the use of this instrument, they seem to have resulted in the opposite. We introduce a two-stage model that examines the acceptance and the compliance decision to explain this observation. The intuition is that stringent enforcement provisions increase the expected non-compliance cost, and as such decline industries' willingness to accept an agreement in the first place. We conclude that due to reciprocity between the enforcement regime and the background legislative threat both should be considered jointly by policy makers.

Key words: Acceptance; compliance; enforcement; negotiated environmental agreements; regulatory threat

1. Introduction

The emergence of negotiated environmental agreements was welcomed with great enthusiasm by policy-makers, industry and academics. Supplementing regulatory measures by other policy instruments, amongst which agreements with industry, was one of the key objectives of the European Commission's Fifth Environmental Action Programme of 1992. Agreements were thought to promote a pro-active attitude on the part of industry, to provide cost-effective, tailor-made solutions and allow for a quicker and smoother achievement of environmental objectives. However the atmosphere gradually deteriorated, as evaluation studies could not really demonstrate significant environmental improvements (e.g. EEA 1997; ELNI 1998; OECD 1999 and 2003). In its evaluation of voluntary approaches the OECD concludes that the environmental effectiveness of negotiated agreements appears rather modest (OECD 1999). Accordingly, a number of researchers concluded that instruments based on voluntarism were only capable of picking the low-hanging fruits (e.g. EEA 1997; ELNI 1998; Khanna and Damon 1999; Alberini and Segerson 2002). Lyon and Maxwell (2003) even claim that the mere existence of voluntary approaches might create welfare losses as they reduce the probability of better instruments being implemented.

Introducing a background legislative threat and strengthening the design of negotiated agreements are recurring policy recommendations (EC 1996; OECD 1999; De Clercq 2002). The background legislative threat option has received much attention in the literature. Segerson and Miceli (1998) prove that the strength of the alternative threat determines the level of ambitiousness of the target industry is willing to accept. In 1999 they developed a normative model in which the polluter undertakes voluntary action under the threat made by a benevolent regulator to implement an abatement quota. Whereas in Segerson and Miceli (1998; 1999) the legislative threat is implemented with a probability described by an exogenous parameter, in Glachant (2003) the legislative threat is endogenous depending on a rent-seeking contest between green and polluter lobby groups. Hansen (1999) has developed a political economy model in which the regulator's objective is biased and differs from that of the threat-making entity. A model by Maxwell, Lyon and Hackett (2000) considers firms that voluntary abate pollution to pre-empt lobbying by consumers in favour of more stringent environmental legislation. All these papers study the welfare effects of negotiated agreements compared to regulatory instruments.

The option of strengthening the design of agreements on the other hand has hardly received attention in the theoretical literature on negotiated agreements. The literature mentioned above ignores design-issues, focuses only on the target

of the agreements and simply assumes full compliance. Empirical research however has show that non-compliance is rather widespread and partly attributed to design issues (e.g. EEA 1997; OECD 1999; De Clercq 2002). The first generation of negotiated agreements were characterised as non-binding agreements that do not provide for sanctions in case of non-compliance (ELNI, 1998). In addition they often contained only vague non-quantified targets and lacked credible and efficient monitoring and reporting requirements (OECD 1999). These agreements consisted only of a moral obligation on the actors to abide by their commitments.

As such, a shift towards 'second-generation' agreements that are legally binding, and contain clearly defined quantitative targets backed with transparent monitoring, reporting and enforcement mechanisms is proposed (EC 1996; OECD 1999). A clear policy strategy and an institutional framework for the use of this instrument are needed. In fact already in the beginning of the nineties, a number of countries developed such an institutional framework for voluntary agreements. Denmark (Article 10 of the Danish Environmental Protection Act of 1992) and Flanders (the Flemish Decree on Environmental Agreements of 1994) have put in place a legal framework. Portugal (Protocol for the Conclusion of Sectoral Voluntary Agreements of 1995) and The Netherlands (Codes of Conduct issued in 1996 and adapted in 2003) have elaborated official

recommendations without legal status. In 1996 the European Commission issued guidelines for the use of negotiated agreements in member states.

This paper distinguishes itself from previous work by taking the option of strengthening of the design of negotiated agreements into account, next to the background legislative threat. Within the design aspects we focus on the control and enforcement regime towards the compliance with the agreement. Above we consider non-compliance as a feasible option. As such the model presented takes a two stage-approach: as well the acceptance as the compliance decision are studied[1].

This paper is organized into sections as follows. In section two the basic setting of the model is introduced. An analysis of the policy options is undertaken in section three. Section four investigates the incorporation of uncertainty in the model. In section five the model is used to explain the implications of the trend towards more formal negotiated agreements that occurred in Flanders, Denmark and the Netherlands. Section six concludes.

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[1] Whereas non-compliance to a negotiated agreement is possible in the model, we however assume perfect compliance to the legislative instruments, which is also questionable in reality. However, compared to negotiated agreements, we believe the probability of non-compliance is lower for legislative instruments. Characteristics like vague targets, free-riding options, ineffective monitoring, non-binding commitments make negotiated agreements more prone to incomplete compliance.

2. The setting

This section presents a two-stage model of negotiated agreements. In short, the sequence of moves is as follows. In the first stage industry has to decide whether to accept the agreement. Industry will accept if the expected cost of accepting the agreement is below the expected cost of non-acceptance. If the agreement is accepted, the game enters the second stage and industry has to decide whether it will comply with the agreement.

As others (e.g. Garvie 1997; Schmelzer 1999; Segerson and Miceli 1999; Glachant 2003) we consider an industry association that groups a number of identical firms and that has the power to make decisions for its members. The whole sector is as such considered as being one single player with an association that coordinates and communicates with the regulator without costs.

Assume a continuum of pollution reduction levels ranging from a status quo (0) to an amount M. In M, all pollution is eliminated. Let α, with $\alpha \in [0,M]$, denote the emission abatement target proposed by the regulator in a negotiated agreement. Let L, with $L \in [0,M]$ denote the Pareto-optimal pollution reduction level. Assuming a welfare-maximising legislator, the abatement level L will be imposed with a probability p ($0 \leq p \leq 1$) by the legislator in case of unilateral intervention with a traditional policy instrument like a permit system or an

abatement quota. As the legislator is independent of the regulator, nor industry

nor the regulator who are partners in a negotiated agreement can influence the

probability p of legislative intervention. The only interconnection between the

legislator and the regulator is the fact that the legislator does not intervene once

an agreement is signed. Both p and L are thus exogenous in the model. As in

Hansen (1999) it is possible that the regulator is willing to accept or to propose

an agreement with a target α that differs from L. One can imagine a number of

reasons like a low urgency profile of the environmental problem, the eager to

present an acceptable solution to a problem that caught much public attention,

the costs associated with the use of other instruments like low acceptance of

emission taxes by industry, control, monitoring or enforcement difficulties of

command-and-control regulation. Partly these arguments are also supported by

the fact because the legislative intervention is uncertain the regulator might

prefer an agreement for the assurance that pollution abatement is undertaken.

Likewise increased stakeholder relations or the pre-emption of a possible

mandatory policy intervention might be good reasons for firms to voluntary

commit themselves to a positive emission reduction target α.

To keep things simple we assume linear abatement costs $C(\alpha)$, with $C(\alpha) =$

$x\alpha$ and $x \in R^+$. As others (e.g. Segerson and Micelli 1998; Lyon and Maxwell

2003) the abatement cost is assumed independent of the instrument put place

(i.e. the legislative or the negotiated one) to make our conclusions independent of imposed assumptions on the economic efficiency of the distinct instruments.

The model is presented in figure 1. The decision tree presents the options and their associated cost for industry. After a negotiation process between policy makers and representatives of an industry association, a proposal for an agreement is presented. Industry then has to decide whether or not to accept this proposal. If the agreement is accepted, the game enters the second stage where the industry has to decide whether to comply with the agreement or not.

Figure 1. The decision tree for industry
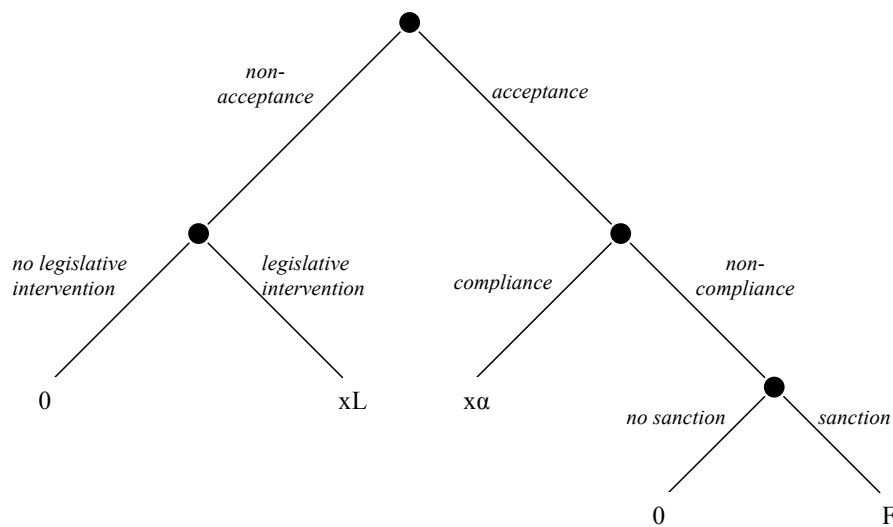
Let us first consider the case where the agreement is accepted and look at the second stage of the game. If industry complies with the agreement, it will bear

the pollution abatement cost $x\alpha$. If industry does not comply, the payoff is defined as qF, where $F \in N^+$, denotes the sanction associated with non-compliance and q ($0 \leq q \leq 1$) denotes the probability that a non-complying industry will be sanctioned. q is thus a measure of the effectiveness of the control and enforcement mechanism. More stringent control and enforcement mechanisms correspond with higher levels of q. F is assumed to be a fine that is independent of the degree of non-compliance. In this view the negotiated agreement is considered as a sort of a contract instead of a part of an on-going policy process. We acknowledge this is a quite restrictive view on the way negotiated agreements are used in practice. Coupling non-compliance of an agreement with a monetary fine is rather unusual. Alternatively, the fine can be interpreted as the estimated cost of the disadvantages of non-compliance. Agreements should be seen as the continuation of a partnership between authorities and industry rather than just the result of it (EC 1996). In this perspective the implications of non-compliance for industry are not paying a fine but rather consist of the loss of the regulator's confidence in the private-public partnership, loss of prestige, loss of public image, increased uncertainty about future policy processes, etc. As such we switch the perspective from an a-ethical short-term profit maximiser to a corporate governance oriented industry.

Regardless of the interpretation, compliance will occur if the abatement cost is below or equal to the expected cost of non-compliance or:

$$x\alpha \leq qF \qquad (1)$$

We denote the threshold level below which all agreements will be complied with as α_c. From (1) it follows that compliance will occur for agreements with

$$\alpha \leq \alpha_c = \frac{qF}{x} \qquad (2)$$

Now we turn to the acceptance decision. If the agreement is not accepted there is a probability p $(0 \leq p \leq 1)$ that the legislator will intervene imposing a pollution reduction level of L, which associates with an abatement cost of xL. Profit maximising firms will only accept an agreement with target α if the cost of accepting is below or equal to the cost of non-acceptance. The acceptance cost of an agreement has an upper limit of qF as industry will opt not to comply if the abatement cost is above the expected non-compliance cost. As such an agreement will be accepted if

$$pxL \geq \min \begin{bmatrix} x\alpha \\ qF \end{bmatrix} \qquad (3)$$

Denote α_a as the threshold level below which all agreements will be accepted. From (3) it follows that acceptance will occur for agreements with

$$\alpha \leq \alpha_a = \begin{bmatrix} pL \\ M \end{bmatrix} \quad \text{if} \quad \begin{matrix} pxL \leq qF \\ pxL > qF \end{matrix} \qquad (4)$$

Figure 2 illustrates the above. Each point on the horizontal axis represents an agreement with the corresponding abatement target. The acceptance cost curve (AC) is indicated in bold and consists of the abatement cost curve (AB) until the expected non-compliance cost and continues horizontally from this point on. One can easily see that all agreements with a target below α_a will be accepted as the acceptance cost is below the expected non-acceptance cost.. Similarly all agreements below α_c will be complied with as the abatement cost is below the expected non-compliance cost Depending on the level pxL with respect to qF, three settings (pxL equal, below or above qF) can be distinguished. Only the second is depicted here. The next section analyses these three settings in depth together with the impact of both policy options: changing

the background legislative pressure and changing the control and enforcement regime.

Figure 2. Acceptance and compliance decision in the basic setting
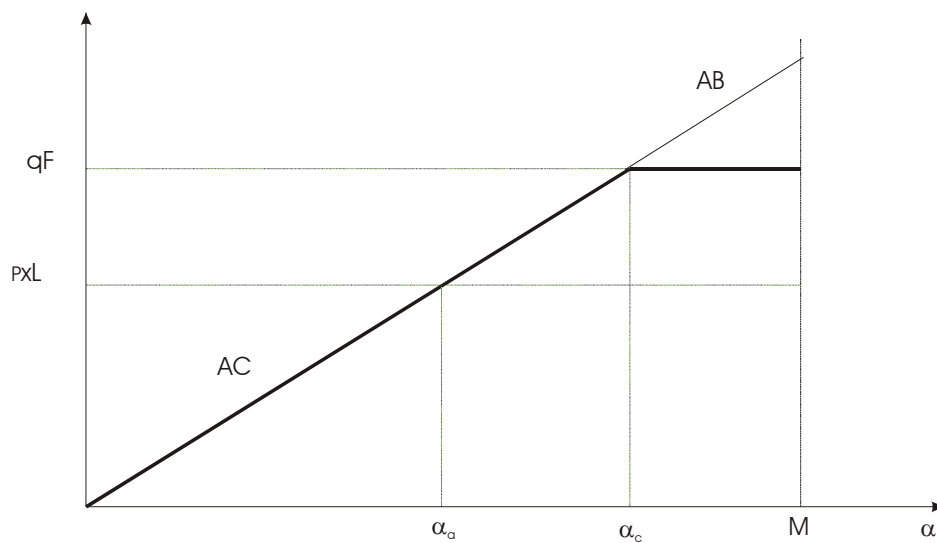
3. Analysing different policy options

The model presented in the previous sections allows investigating the implications of two policy options: changing the background legislative pressure p and changing the strictness of the control and enforcement regime q. To further elaborate the outcomes of these policy options, we define the

following evaluation criteria. The acceptance range is the interval $[0, \alpha_a]$ containing all agreements that will be accepted. Similarly, the compliance range is defined as the interval $[0, \alpha_c]$ of all agreements that will be complied with. The compliance rate on the other hand is the ratio $\dfrac{\alpha_c}{\alpha_a}$ of all agreements that will be complied with on all agreements that are acceptable. An agreement is considered successful if it is accepted and complied with, regardless of the ambitiousness of the agreement's target[2]. As such the range of successful agreements equals $[0, \min(\alpha_a; \alpha_c)]$. Changes in a policy regime are considered positive if they increase this range. As the outcomes of both policy options depend on the initial level of the background legislative threat on the one hand and the expected non-compliance cost on the other, three situations are distinguished.

3.1. The background legislative threat equals the expected non-compliance cost

In case the expected cost of non-acceptance equals the expected cost of non-compliance, all agreements that will be accepted will be executed as α_a equals

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[2] We agree that this definition of a successful agreement is open to question. Whether an agreement with a very low target that will be complied with is a benefit for society is questionable. It should therefore be stresses that in this paper the notion 'successful agreement' must only be interpreted as an agreement that will be accepted and complied with.

α_c.[3] The compliance rate is 1 and α_a = pL = $\dfrac{qF}{x}$. In fact in this case the

distinction between the legislative sanction for non-acceptance and the non-compliance sanction is redundant. The legislative sanction might function both for non-acceptance and non-compliance and our results are similar to those of Segerson and Miceli (1998) who found that the strength of the background legislative threat positively influences the target industry is willing to accept, rendering our efforts superfluous.

In this setting, none of both policy options used separately increases the range of successful agreements. If the legislative threat would be strengthened, the acceptance range would increase but the compliance range would stay the same. As such the additional agreements that become possible will not be complied with and the range of successful agreements is unchanged. Increasing the control and enforcement regime on the other hand would widen the compliance range but would not change the acceptance range leaving the range of successful agreements unchanged.

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[3] For agreements with a target above α_a a company would be indifferent between acceptance and non-acceptance. For analytical purposes we assume that in these cases an agreement will not be accepted.

3.2. The background legislative threat is below the expected non-compliance cost

As illustrated in figure 2, in this setting α_a is on the left of α_c. This implies that all agreements that are accepted will be fulfilled. The compliance rate is above 1. However in this situation, agreements in the interval $[\alpha_a; \alpha_c]$ would also be complied with but are not concluded because the legislative threat is too low to make them acceptable for industry.

The range of successful agreements can be increased in this setting by tightening the legislative threat. This widens the acceptance range without changing the compliance range. If the new legislative threat stays below the expected non-compliance cost, the compliance rate stays at least 1. Strengthening the control and enforcement regime however has a no influence on the range of successful agreements as it widens the gap between α_a and α_c.

3.3. The background legislative threat is above the expected non-compliance cost

In the final setting, the compliance range is smaller than the acceptance range that equals $[0, M]$. The compliance rate is below 1. This might be worse

than the previous situation as there is no use in concluding agreements that will not be complied with whereas not concluding an agreement leaves open the opportunity to put in place another instrument.

Tightening the strictness of the control and enforcement regime increases the range of successful agreements as it widens the compliance range. On the other hand, there is no use in further strengthening the legislative pressure as this reinforces the initial discrepancy between the non-acceptance and non-compliance cost. The range of acceptable agreements stays the same.

3.4. Summarizing the different settings

Table 1 provides a summary of the three settings. Column 2 provides a short description of the initial setting. The last two columns draw up an evaluation of the two policy options. "+" indicates a positive influence, "-" a negative one. The non shaded areas point to cases in which the policy measure has a positive influence, meaning that the range of successful agreements gets wider, the lighter shaded areas point to cases in which the policy measure has no influence and the darker shaded area points to the case in which the policy measure has a negative influence in the sense that the compliance rate declines below 1 (but the range of successful agreements remains unchanged).

Table 1: A summary of the different settings

Initial setting	Description	Evaluation criteria	Increase in p	Increase in q
$pxL = qF$	AR = CR	AR	+	=
		CR	=	+
	CRT = 1	CRT	-	+
		SR	=	=
$pxL < qF$	AR < CR	AR	+	=
		CR	=	+
	CRT > 1	CRT	-	+
		SR	+	=
$pxL > qF$	AR > CR	AR	=	=
		CR	=	+
	CRT < 1	CRT	=	+
		SR	=	+

Note: AR= acceptance range; CR = compliance range; CRT = compliance rate; SR = range of successful agreements

If we review the results of the three cases, the first in which pxL = qF can be categorized as first best due to a compliance rate of 1 and no unexploited agreements. Assuming a rational regulator this outcome will occur. Given the exogenously determined level of pxL, the regulator will determine its level of monitoring and enforcement stringency q so as to get the expected non-

compliance cost as high as the background legislative threat and subsequently proposes an agreement with $\alpha = \alpha_a$. In this case α_a will be below the Pareto-optimal abatement level L if probability of legislative intervention is below 1. The same holds for the second setting. Only in the third setting agreements with $\alpha > L$ are possible but these agreements will not be complied with. It follows that a successful agreement will always have a target below L if p < 1. The reason is the assumption that the pollution abatement costs are equal under the legislative and negotiated policy instrument. If one would assume lower costs under the negotiated agreement for instance due to increased flexibility or transaction costs (e.g. Goodin 1986; Baggott 1986; Segerson and Miceli 1999) or if one would assume additional benefits to the voluntary approach for instance due to stakeholders' recognition, agreements with a target above L would be possible.

The fact that the first settings with an agreement of α_a comes out as first best might point to the needlessness of making a distinction between the sanction in case of non-acceptance and non-compliance. The legislative threat that triggers the inception of a negotiated agreement might also function as a threat to make industry fulfill their promises. However, we believe there are some arguments that support the distinction made.

First of all, in real-life settings the use of a credible legislative threat as a sanction for non-compliance is not always straightforward. The following arguments support this claim. Firstly, it is important to notice that, as in our model, the political negotiators are often not the ones having legislative powers. The power to put in place an alternative instrument is in the hands of the legislator, whereas negotiated agreements are often concluded by the regulator. Frequently the task of negotiating and drawing up an agreement is passed on to public agencies like an environmental protection agency (Glachant 2003). If national law does not empower executive branches of government to sign such agreements, these contracts cannot be legally binding. In that case, a binding commitment not to introduce new legislation unless the voluntary action fails to meet the target is impossible. The trend towards multilevel governance is another disturbing factor, especially in Europe. Agreements concluded by regional authorities might interfere with federal or even European competences or vice versa. Secondly, several researchers have pointed to the fact that negotiated agreements are frequently used because of the aversion to command-and-control or market-based instruments (e.g. Pesaro 2001; Lyon and Maxwell 2003; OECD 2003). Agreements are especially useful in the experimental phase of legislation, when there is great uncertainty over the technical measures to be adopted, the goals to be achieved or the socio-economic impact of regulations

(Meadowcroft 1998). In the European Union, climate change agreements and agreements related to waste management are typical examples (Börkey and Lévêque 1998). In the US most public voluntary programs deal with climate change where the political will to introduce legislative measures was absent (Lyon and Maxwell 2003). In short, negotiated agreements are especially used as a second best solution due to political, economic or social aversion to other instruments. Thirdly, as legislative processes are often time-consuming, coupling a negotiated agreement with a legislative initiative will probably lengthen and complicate the negotiation phase. This might jeopardise the advantage of fast and flexible policy-making that is often attributed to voluntary agreements. Finally, whereas the implementation of a legislative alternative as a sanction probably will affect all companies in a sector, it might be more useful to have a sanctioning mechanism that could target only those actors that hinder the successful fulfilment of the agreement.

Second, the legislative threat and the control and enforcement policy have a different role to play. In the first phase, policy makers should create an atmosphere that is able to induce industry to get involved by putting the issue on the political agenda, creating social support, pointing to possible win-win solutions or even, if necessary, threatening with a legislative proposal. Once an fertile environment is created, the responsibility is shifted to executive policy

agents and their task is to first draw up an agreement and subsequently to "keep the agreement alive" by organizing follow-up meetings, monitoring compliance, drawing up evaluations reports, solving practical implementation problems, bringing together actors involved or even, if necessary, threatening with fines or other sanctions.

Finally, even if the legislative alternative is used both as the sanction for non-acceptance and non-compliance, the probability that it will enter in force might differ between the non-acceptance case (p) and the non-compliance case (q). One can imagine the political will to get a legislative proposal through parliament will be higher if policy makers feel cheated by an industry association that after a couple of years proved not to comply with an agreement compared to the case where an industry association could not get its members to 'voluntary' accept an agreement. Along this line one could also argue that the non-compliance sanction equals $qF + pxL$ as the legislator regains its power to unilaterally impose legislation in case industry failed to comply. In this case the second setting might be most realistic as one could argue that qF is always positive as industry at least loses some public and/or regulator's trust.

So if there is a distinction between the non-acceptance and the non-compliance sanction, we arrive at the second or the third setting. In the second setting the compliance rate is above 1 but the limited acceptance range indicates

that only low target agreements are possible. The final setting shows the opposite case with a large range of acceptable agreements but a compliance rate below 1. We argued that the second setting might be preferred as there is no use in concluding agreements that will not be complied with whereas not concluding agreements still leaves open the opportunity of other policy interventions.

When looking at the two policy options, one notices that only two out of the six cases increase the range of successful agreements. Not surprisingly, this is the case when the non-acceptance and the non-compliance sanction are brought more in balance. The conclusion that follows is that notwithstanding the fact that both have a different role to play; the non-acceptance sanction that should create a fertile environment for the conclusion of negotiated agreements and the non-compliance sanction that should keep the agreement alive must be balanced. In the following section explores the introduction of uncertainty in the model.
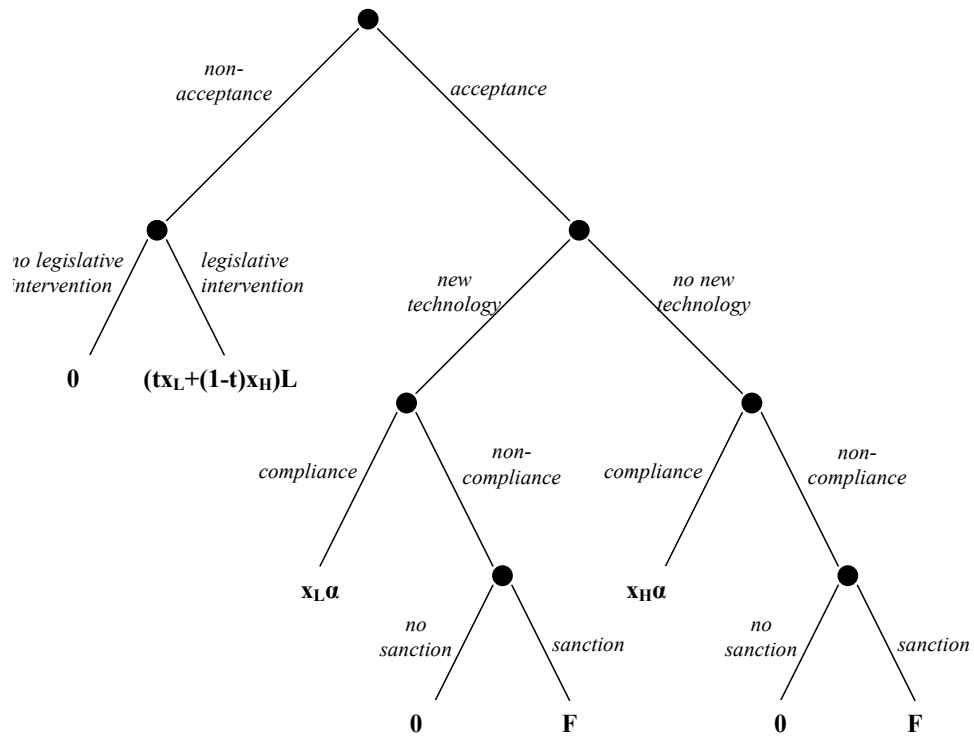
4. Uncertainty about the abatement cost

Up till now, all parameters in the model were known in advance. Typical of negotiated agreements however is that the environmental targets have to be

reached only within a couple of years. This introduces a time lag between the acceptance and compliance decision, which brings along a certain degree of uncertainty. As such the acceptance decision is taken in uncertainty due to unknown future parameters like for example profit-levels, innovation of pollution abatement or prevention technologies, the price of emission credits or the strictness of the control and enforcement regime. This information only becomes available as time goes by and is not available when the acceptance decision has to be made.

In the following we will introduce uncertainty with regard to the abatement cost. More specific we assume that there is a certain probability (t) that a new abatement technology will be introduced that brings down the abatement cost to $x_L\alpha$ instead of the higher abatement cost of $x_H\alpha$. The decision three is depicted in figure 3.

Figure 3. Decision tree for industry with uncertainty about the abatement cost

Due to the uncertainty about the future abatement cost, industry's acceptance decision becomes:

$$p[tx_L + (1-t)x_H]L \geq \min \begin{bmatrix} tx_L\alpha + (1-t)x_H\alpha \\ qF \end{bmatrix} \qquad (5)$$

From (5) it follows that acceptance will occur for agreements with

$$\alpha \le \alpha_a = \begin{bmatrix} pL \\ M \end{bmatrix} \quad \text{if} \quad \begin{array}{l} p[\text{tx}_L + (1-t)x_H]L \le qF \\ p[\text{tx}_L + (1-t)x_H]L > qF \end{array} \tag{6}$$

By the time the compliance decision has to be taken, the firm knows whether the new technology is available or not so the decision is taken without uncertainty. If the new technology is available, all agreements for which the compliance cost is below the expected non-compliance cost will be complied with or:

$$\alpha_c^L \le \frac{qF}{x_L} \tag{7}$$

Alternatively, if the new technology is not available, the threshold level below which all agreements will be complied with equals:

$$\alpha_c^H \le \frac{qF}{x_H} \tag{8}$$

Figure 4 illustrates the introduction of uncertainty with respect to the abatement cost. The expected acceptance cost curve is depicted in bold. The slope of the curve depends on the probability of the introduction of the new pollution abatement technology. The lower the probability that the technology will be available, the steeper the first part of the curve and the closer α* lies to α_C^H.

Figure 4. the Acceptance and compliance decision with uncertainty about the abatement cost
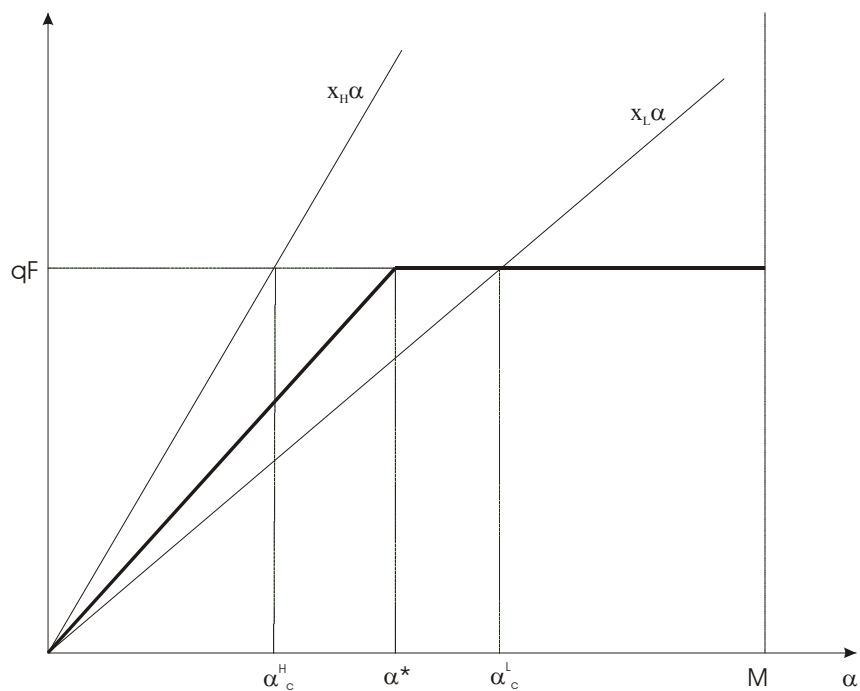
Again depending on the level of the background legislative threat compared with the expected non-compliance cost, three situations can be distinguished:

- $p[tx_L+(1-t)x_H]L = qF$; In this case all agreements with a target below or equal to $\alpha_a = \alpha^* = \dfrac{qF}{tx_L + (1-t)x_H}$ will be accepted. Notice that α^* is positively influenced by t. Whether the agreement will be complied with depends on the actual abatement cost. If the new technology is available, compliance will occur, if the new technology is not available the firm will prefer to bear the non-compliance fine.

- $p[tx_L+(1-t)x_H]L < qF$; In this case α_a is situated at the left of α^*. If $\alpha_a \leq \alpha_c^H$ all agreements that are concluded will be complied with, if $\alpha_c^H < \alpha_a$ the agreement will be complied with if the new technology is available.

- $p[tx_L+(1-t)x_H]L > qF$; In this case all agreements are acceptable ($\alpha_a = M$). If $\alpha \leq \alpha_c^H$ the agreement will be complied with, if If $\alpha > \alpha_c^L$ the agreement will not be complied with and if $\alpha_c^H < \alpha < \alpha_C^L$ compliance will occur if the new technology is available.

One of the consequences of uncertainty is that there is no longer a first best proposal for the regulator as in the case without uncertainty. One could argue

that as in the basic model the regulator should set the expected non-compliance cost equal to the background legislative threat and subsequently propose α*. However, in this case there is a probability that industry in the end will not comply with the agreement. A risk averse regulator might therefore prefer to propose a target α the is closer to α_C^H .

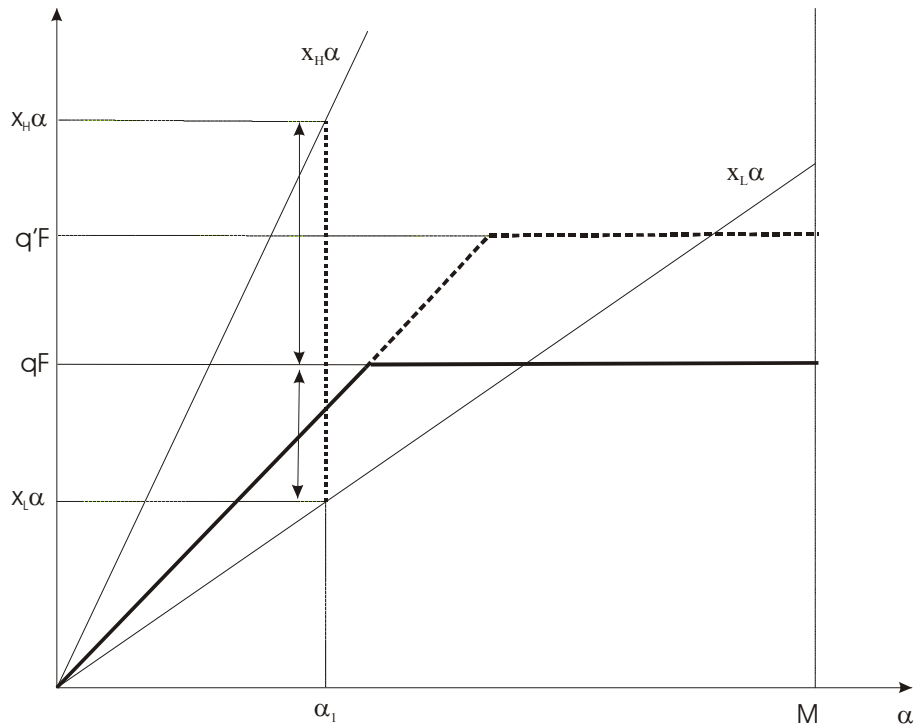**Figure 5. The compliance decision under uncertainty**

Figure 5 portrays the uncertainty issue for an arbitrarily chosen α_1. The setting depicts the situation in which the background legislative threat is below

the expected non-compliance sanction. Let us assume here that the abatement cost can be each level between $x_L\alpha$ and $x_H\alpha$. The probability that compliance will occur then equals $\dfrac{|x_L\alpha; qF|}{|x_L\alpha; x_H\alpha|}$.

Figure 5 also illustrates that the impact of the policy measures might have a different impact compared to the situation without uncertainty. In the model without uncertainty, an increase in the strictness of the control and enforcement regime only increases the compliance range further above the acceptance range, which pushes the compliance rate further above 1 without changing the range of successful agreements. In the setting with uncertainty, a change in the strictness of the control and enforcement regime however positively influences the compliance probability which now equals $\dfrac{|x_L\alpha; q'F|}{|x_L\alpha; x_H\alpha|}$

Table 2: A summary of the different settings with uncertainty

Initial setting	Description	Evaluation criteria	Increase in p	Increase in q
$p[tx_L+(1-t)x_H]L = qF$	$CR_H < AR < CR_L$	AR	+	=
		CR_H; CR_L	=	+
	$CRT_H < 1 < CRT_L$	CRT_H; CTR_L	-	+
		SR_H	=	+
		SR_L	+	=
$p[tx_L+(1-t)x_H]L < qF$	$CR_H < AR < CR_L$	AR	+	=
		CR_H; CR_L	=	+
	$CRT_H < 1 < CRT_L$	CRT_H; CTR_L	-	+
		SR_H	=	+
		SR_L	+	=
$p[tx_L+(1-t)x_H]L > qF$	$CR_L < AR$	AR	=	=
		CR_H; CR_L	=	+
	$CRT_H < CRT_L < 1$	CRT_H; CTR_L	=	+
		SR_H	=	+
		SR_L	=	+

Table 2 presents a summary of the impact of the policy changes in the different settings. Compared to the basic model where each policy measure that balanced the non-acceptance with the non-compliance cost, in the model with uncertainty, only an upward shift of the non-compliance cost has a positive influence independent of the abatement cost. In four settings, the policy

measures are positive or neutral depending on the abatement cost. The positive cases are again those that balance the non-acceptance and non-compliance cost: when the low abatement cost applies $\alpha_a < \alpha_C^L$ and an increase in the background legislative threat is needed, if on the other hand the high abatement cost applies $\alpha_C^H < \alpha_a$ and an increase in the expected non-compliance cost is needed. Finally there is only on setting in which the policy measure has no influence at all. The following section explores the explanatory power of the model presented for describing the implication of trend towards more formal negotiated agreements that occurred in some countries.

5. The trend towards more formal negotiated agreements

The model presented in the previous sections is illustrative in explaining the implications of the trend towards more formal negotiated agreements that occurred in the nineties. This section will mainly build on the case of Flanders (the largest of the two Belgian regions) as the authors are most familiar with this case. However we believe our analysis holds up for a larger territory. Some seemingly corresponding observations in Denmark and the Netherlands are denoted without having the same in depth background information as for the Flemish case.

In the nineties a shift to a more formal approach towards the use of negotiated agreements has occurred (EC 1996). In its Communication on Environmental Agreements of 1996, the European Commission calls for agreements with a binding form. Disappointing experiences from the past were attributed partly to the dubious legal status, the lack of quantified targets and the resulting lack of monitoring and enforcement possibilities. The OECD evaluation report of 1999 comes to similar conclusions.

Both in Flanders and in Denmark a legislative framework was introduced aiming to stimulate the use and effectiveness of voluntary agreements. In Flanders a legal framework for binding negotiated agreements was introduced in 1994. Negotiated environmental agreements must take the form of a contract (contract sui generic), parties need to have legal status, to be representative for the sector and to have the explicit mandate to conclude agreements. Every draft agreement has to be published in the Official Journal and public bodies have to be consulted. In case of non-compliance each party has the right to demand a compulsory execution in kind or by equivalent.

Whereas the legislative framework was installed to increase the use of the opposite was the case, certainly in the first years. Appendix A shows a list of all negotiated agreements concluded in Belgium. Three periods can be distinguished. In the first period (1988-1992) 12 agreements were signed

(Bocken et al. 1994). Based on an inquiry with representatives from business associations and regulators, Bocken (1994) confirms the uncertainty about the juridical binding character of these agreements. Several times it turned out that different representatives from industry, even with regard to the same agreement, gave a different answer concerning the juridical binding character. One business association catalogues the agreement as a gentlemen's agreement whereas another calls the agreement juridical binding. The evaluation of these agreements was modestly positive (Bocken 1994; De Clercq et al. 2001).

In the second period (1993-1996) no agreements were signed. This can be explained by the uncertainty due to the preparation and implementation of the legislative framework. Above some preparatory negotiations proved that a stronger legislative threat was needed to convince industry to enter into the agreements government representatives had in mind (Wille 2000). This was done by the introduction of the duty of acceptance in the Flemish waste policy. The duty of acceptance obliges producers to take back the products they have put on the market at the end of their life cycle. From 1998 on certain waste streams (tyres, batteries, accumulators, cars, electronic equipment…) became subject to this regulation and subsequently agreements were concluded to implement this duty (De Clercq and Bracke 2005). As such it took over 3 years

after the framework was installed before the first agreement was signed in 1997. In the most recent period (1997-2006) 10 agreements have been signed.

As well the amount and certainly the rate at which agreements are signed, seems to have declined due to the implementation of the legislative framework. Next to the underlying legislative framework, the different character of these two groups of agreements also emerges from the average length of the agreement. The first group of agreements counts on average 4,2 pages whereas the second group counts on average 9,6 pages. Next to the number of pages, the front and spacing of the second group is smaller. As a consequence if one would measure the average amount of words, the difference would be even more pronounced. Above of the spectre of environmental issues targeted is in all but one agreement the collection and recycling of waste streams. These 9 agreements have only been signed after the introduction of the duty of acceptance in the waste management legislation. Besides, two agreements have been signed outside the legislative framework and several negotiation processes were set up but never ended in the signing of an agreement (SERV 1997).

Figure 3 uses the model presented in this paper to distinguish the three periods. The acceptance and compliance range in each of the periods is indicated below the horizontal axis. In the first period industries' perception of the non-compliance cost was low (q_1F) amongst others due to the dubious legal

character of the agreements. Most agreements were concluded due to a rather lenient background legislative threat (p_1xL) (De Clercq et al. 2001). In most cases this treat existed in the fact that the environmental problem was 'going around' in the policy arena at European or international level (e.g. the protocol of Montreal on CFCs, packaging waste at the European level). In this period the background threat must have been above the perceived non-compliance cost resulting in a large acceptance range and quite a high number of agreements were concluded. With respect to compliance most agreements were evaluated rather positive but some were clear examples of non-compliance (De Clercq et al. 2001). In these cases the target probably exceeded the compliance range.

The legislative framework introduced in 1994 explains the upward shift in the non-compliance sanction (q_2F). The task of monitoring the implementation of agreements was taken more serious and the regulator had means to act in case of non-compliance. However because the background legislative pressure was not increased, the acceptance range declined considerably. As a result, the agreements the government had in mind were not acceptable for industry and no agreements were signed in this period.

Figure 3. The trend towards more formal agreements
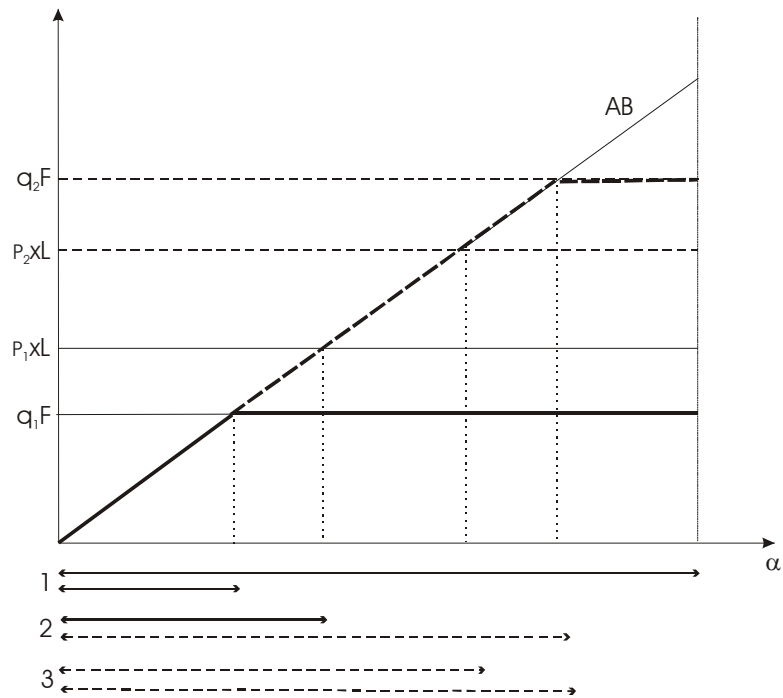
The situation changed again by the introduction of the duty of acceptance in Flemish waste policy. Unlike in the first period where the treat was rather the fact that a subject was on the policy agenda, the threat was now actually a part of the existing Flemish waste legislation (p_2xL). In the figure one notices that the acceptance range again widens and comes close to the compliance range. In this environment, the last group of negotiated agreement were closed. In

general, as well the level of ambition of the targets as the actual implementation is evaluated rather positive (De Clercq and Bracke 2005).

Next to Flanders, Denmark is the only European country in which a legislative framework for negotiated agreements was introduced. In 1991 a specific provision on binding agreements was introduced in the Danish Environmental Protection Act (Gebers 1998). In Denmark only one agreement (in 1996 on the collection and recovery of lead accumulators) has been signed under this provision (ELNI 1998). The number of non-binding agreements (gentlemen's agreements) signed before the introduction of the legal provisions however is significantly higher with 17 agreements (ELNI 1998). Also in Denmark the enhancement of the expected non-compliance cost seems to have limited the acceptance range. ELNI (1998) concludes that trade or industry organisations seem to be reluctant to enter in these binding agreements.

Thus whereas the aim was to stimulate the use and effectiveness of negotiated agreements by introducing a legislative framework, the experiences in Flanders and Denmark proved that it became difficult to get industry aboard.

In the Netherlands the use of negotiated agreements, called covenants, is considered very successful (OECD 1999). Over a hundred agreements have been closed (EC 1997). One of the reason researchers give for explaining the success is the fact that in this country the guidelines concerning the use of

negotiated agreements do not have a legal status and as such leave enough room for flexibility, one of the most important advantages of this instrument (e.g. EC 1997; ELNI 1998). Secondly the context in which the agreements are concluded is quite unique. In the Netherlands, the government strongly encourages negotiated agreements as the central instrument for reaching the goals set out in the Dutch National Environmental Policy Plan (NEPP). The agreements are considered as an instrument for implementing these policy goals. Environmental plans are prepared by each participating firm in cooperation with the environmental agencies (Glasbergen 1998). Firms are closely monitored and held liable individually. Non-compliance is penalized through increased stringency of the operation license (Khanna 2001). The legislative pressure of the government by the introduction of NEPP makes binding agreements acceptable and stringent policy control and enforcement mechanism explains the high compliance rate. As such as well the legislative pressure as the expected cost of non-compliance are simultaneously kept at high levels, resulting in the first setting which combines a high level of acceptable agreements with a high compliance rate.

6. Conclusion

When the first negotiated agreements emerged in the policy arena, they were characterised as non-binding gentlemen's agreements. Moreover, most agreements had only vague targets, little provisions concerning monitoring and control and hardly any sanctions in case of non-compliance. This has given way to much criticism towards the effectiveness and legality of negotiated agreements. In time, the European Commission and several EU member states have enacted regulations or guidelines regarding the use of negotiated environmental agreements. Denmark and Flanders have codified basic rules; the Netherlands has elaborated official recommendations.

However it turned out that the introduction of safeguards threatens the acceptability of the instrument. Voluntary agreements need to be approved by industry, and firms are often reluctant to accept some of these safeguards. This suggests that negotiated agreements are by nature flexible and ad hoc policy solutions. Any attempts to establish safeguards de facto complexities these arrangements and brings them closer to traditional legislative/regulatory solutions. In this way they become less appealing to firms.

In this paper a simple setting was introduced that shows how the establishment of safeguards like more stringent control and enforcement

provisions has a negative influence on the industries willingness to accept voluntary agreements. However, such provisions seem pivotal in enhancing the environmental effectiveness of this instrument. The analysis pointed out that both the legislative pressure and the control and enforcement regime must be considered jointly. On the one hand, too much focus on enforcement undermines the industries willingness to sign agreements. If policy makers on the other hand rely on the background legislative pressure, the compliance rate is expected to decline. The Netherlands shows that strong political pressure and non-compliance sanctions are needed to enable the successful use of negotiated agreements. Experiences in Denmark and the Flemish region however, point out that finding a right balance between both is not an easy task for policy makers.

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Appendix A: Negotiated Agreements in Belgium

	Agreement	date	pages
A1	Gedragscode tot het verminderen van de hoeveelheid kwik in primaire batterijen die in België op de markt worden gebracht *Agreement to reduce the amount of mercury in batteries*	1/1/1988	4
A2	Overeenkomst betreffende het gebruik van CFK's als drijfgas in aërosolen *Agreement concerning the use of CFCs as propellant in aerosols*	10/3/1988	3
A3	Overeenkomst tussen de Belgische Staat en de Belgische Vereniging van verwerkers van oliën en vetten voor technische doeleinden *Agreement to reduce the amount of phosphates in washing-powders*	12/9/1988	3
A4	Overeenkomst tussen de Belgische Staat en de Belgische Unie voor koeltechniek en luchtconditionering *Agreement to reduce the use of CFCs in cooling equipment*	30/1/1989	3
A5	Overeenkomst tussen de Belgische Staat en Fechiplast *Agreement to reduce the use of CFCs with the synthetic industry*	3/3/1989	3
A6	Basisovereenkomst verpakkingsafval *Basic agreement concerning packaging waste*	25/6/1990	8
A7	Convenant verpakkingsafval *Covenant concerning packaging waste*	26/3/1991	9
A8	Overeenkomst met de BASF Antwerpen n.v. inzake de beperking en voorkoming van milieuverontreiniging aan de bron *Agreement with BASF to reduce and prevent environmental pollution at the source*	26/9/1991	4
A9	Overeenkomst betreffende de export van pesticiden onderworpen aan de PIC (Prior Informed Consent) procedure *Agreement concerning the export of pesticides subject to the PIC procedure*	4/10/1991	4
A10	Overeenkomst betreffende emissiereducties van SO_2 en NO_X afkomstig van electriciteitsproductie-installaties *Agreement to reduce the amount of SO_2 and NO_X emissions from power stations*	18/10/1991	8

A11 Protocolakkoord tussen het Waalse Gewest, het Brusselse Gewest, het Vlaamse Gewest 23/10/1991 3

en de Belgian Aluminium Association

Agreement to recycle aluminium waste

A12 Milieubeleidsovereenkomst met de bedrijfssector inzake de opslag van 17/1/1992 4

huishoudbrandolie bij particuliere verbruikers voor de verwarming van gebouwen

Agreement concerning the storage of oil for the heating of private houses

B1 Milieubeleidsovereenkomst betreffende de selectieve inzameling van oude en vervallen 9/10/1997 8

geneesmiddelen

Agreement concerning the waste medicines

B2 Milieubeleidsovereenkomst betreffende de uitvoering van de VLAREA- 10/2/1999 4

aanvaardingsplicht drukwerkafvalstoffen (periodieke pers)

Agreement concerning waste paper (periodic press)

B3 Milieubeleidsovereenkomst betreffende de uitvoering van de VLAREA- 24/4/1998 4

aanvaardingsplicht drukwerkafvalstoffen (reclamedrukwerk)

Agreement concerning waste paper (advertising sector)

B4 Milieubeleidsovereenkomst betreffende de uitvoering van de VLAREA- 19/5/1999 12

aanvaardingsplicht afgedankte voertuigen

Agreement concerning waste cars

B5 Milieubeleidsovereenkomst betreffende de uitvoering van de VLAREA- 1/7/1999 11

aanvaardingsplicht afvalbanden

Agreement concerning waste tyres

B6 Milieubeleidsovereenkomst betreffende de uitvoering van de VLAREA- 1/6/2001 16

aanvaardingsplicht afgedankte elektrische en elektronische apparatuur

Agreement concerning waste electric and electronic appliances

B7 Milieubeleidsovereenkomst betreffende de uitvoering van de VLAREA- 1/11/2003 11

aanvaardingsplicht afvalloodstartbatterijen

Agreement concerning waste accumulators

B8 Milieubeleidsovereenkomst betreffende de uitvoering van de VLAREA- 1/11/2003 11

aanvaardingsplicht afvalbatterijen

Agreement concerning waste batteries

| B9 | Milieubeleidsovereenkomst betreffende de invoering van een milieuzorgsysteem in het kader van bodemsaneringswerken | 1/7/2004 | 10 |

Agreement concerning environmental management systems for soil sanitation

| B10 | Milieubeleidsovereenkomst betreffende de uitvoering van de VLAREA-aanvaardingsplicht van afvalfotochemicaliën | 17/12/2004 | 9 |

Agreement concerning waste photo chemicals

Source: A1-A12: Bocken et al (1994) ; B1-B10: www.ovam.be