

# Experiences with Long Term Agreements on Energy-efficiency Improvements in the European Union

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## 1 Introduction

Voluntary agreements on energy efficiency in manufacturing industry become increasingly popular as a policy instrument to limit or reduce the growth of carbon dioxide emissions in manufacturing industry.

In the European Union some experience exists on such voluntary agreements. The European Commission has issued a Communication providing guidelines for negotiated agreements<sup>1</sup> (EC, 1996). Several agreements have been closed at the level of the European Union as a whole (e.g. on the energy efficiency of passenger cars and electric equipment). Up to now no European-wide agreements exist with respect to energy efficiency in manufacturing industry. However, in some individual countries in the European Union such voluntary agreements are in place.

The aim of this paper is to share the experience obtained with voluntary agreements in Europe. First of all, an overview will be provided of voluntary agreements in four countries. Next, the oldest agreements, those of the Netherlands, will be discussed in more detail. Finally, conclusions will be drawn on lessons learned.

## 2 Voluntary agreements within the EU

This paragraph gives a brief profile of four voluntary agreements scheme's on improving the energy-efficiency of the industry currently operating in Member State of the European Union. This paragraph summarises the characteristic features of the four agreements such as; 1) motive, 2) target groups and coverage, 3) type of targets and timetables, 4) policy mixes, 5) monitoring, 6) enforcement's and 7) results. In conclusion lessons learned on working with voluntary agreements are given. The overview is derived from a study carried out by Krarup and Rameshol (2000)<sup>2</sup>.

### 2.1 The Dutch Long-term Agreements on Energy-Efficiency

1. The Dutch Long-term Agreements on Energy-Efficiency were introduced in the early nineties. Firms that join a sectoral LTA must improve energy-efficiency as far as practically and economically feasible. In return the Dutch governments agrees not to introduce new regulation on energy-efficiency and give financial support.
2. Target groups are all industrial branches with energy consumption over 1 PJ per branch. Up till now 29 industrial LTAs have been concluded, according to government figures covering about 90% of the total industrial energy consumption of the Netherlands. Approximately 1250 firms are actually involved.

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<sup>1</sup> The term negotiated agreement is sometimes used as an alternative for voluntary agreements to stress the two-sided character of the agreements between the government and the private sector.

<sup>2</sup> Krarup and Rameshol go into detail on five instead of four voluntary agreements. The Swedish ECO-Energy is left out in our overview because its effort aimed at preparing companies for environmental certification (EMAS and ISO 14001) and did not specifically aim at improving the energy-efficiency or reducing CO<sub>2</sub>-emissions. A total of more than 30 firm were involved in the agreement which covered only 1.5% of the industrial energy consumption.

3. General targets set in the LTAs are an energy-efficiency improvement of 20% (with some exception that will be dealt with in the next section) in 2000 compared to 1989 level.
4. The introduction of voluntary agreements is supported by other policy measures such as: subsidy schemes for demonstration projects, tax reduction for energy-efficient investments and information and consultancy services.
5. Firms must annually report results on energy-efficiency improvement to the Dutch energy-agency Novem. No independent check is carried out.
6. Individual firms can be excluded from the LTA if they fail to provide an energy conservation plan and annual monitoring results. Firms failing the obligations will be subject to existing regulations, i.e. environmental permits.
7. So far the 29 LTAs resulted in an energy-efficiency improvement of about 17.4% in 1998 compared to 1989 level.

## **2.2 The Danish Agreements on Industrial Energy Efficiency**

1. The Danish Agreements on Industrial Energy Efficiency entered in 1996, 1997 and 1998. Most important incentive for the companies to enter into an agreement is a substantial CO<sub>2</sub>-tax rebate.
2. Target groups for the Danish CO<sub>2</sub>-agreement scheme are energy-intensive companies. Under the agreements set in 1996 and 1997 143 firms were involved covering approximately 45% of industrial energy-consumption.
3. No overall quantitative targets are set within the voluntary agreements. Qualitative targets are realisation of investment projects with a payback period up to 4 years, resulting from energy audits carried out at individual firms. Besides, energy management systems have to be introduced.
4. Introduction of voluntary agreements was supported by free energy audits, subsidy schemes for energy-efficient investments and energy management and accounting systems.
5. Individual firms must annually deliver a progress report to the Danish Energy Agency. The fulfilment of the agreements must be reported together with the status of the energy management system.
6. The Danish Energy Agency can cancel agreements with individual companies who fail to meet the obligations. As a consequence the CO<sub>2</sub>-tax rebate for the firm is cancelled.
7. It was estimated that the agreements will lead to a 6% reduction in CO<sub>2</sub>-emissions in 2005 from the firms that signed an agreement compared to Business-as-Usual (0.4% of the total Danish CO<sub>2</sub>-emission).

## **2.3 The French Voluntary Agreements on CO<sub>2</sub>-reduction**

1. The French Voluntary Agreements scheme is part of the National Programme for the Prevention of Climate Change drawn up in 1995. Within this framework parties agreed upon a dialogue approach (voluntary agreements instead of CO<sub>2</sub>-taxes) toward energy-intensive industries in order to limit negative competitive effects.
2. Target groups are energy-intensive industrial branches. Up to present seven voluntary agreements have been concluded with different branches involving 33 individual firms together consuming less than 40% of the industrial energy-use.
3. Different quantitative targets are set. The aluminium industry agreed upon a 19% reduction in specific CO<sub>2</sub>-emission (CO<sub>2</sub>-emissions per tonne of product) and a 2% increase in absolute CO<sub>2</sub>-emissions in 2000 compared to 1990 level. The package glass industry agreed to a 27% reduction in specific CO<sub>2</sub>-emission and a 10% absolute reduction in 2005 compared to 1990 level.
4. Few measure to support the agreement exists in France. The lack of co-ordination of the voluntary agreements and other measures supporting improvement of energy-efficiency is stressed as a clear weakness in the implementation process in France.

5. Annual self-reporting provisions at branch level are operational. Third party monitoring provision is not included and data are therefore not checked and analysed for evaluation of individual firm performance or revisions of the scheme.
6. No sanctions are specified in the standard voluntary agreement.
7. Available progress reports indicate that specific CO<sub>2</sub>-emission targets set for the aluminium and the package glass industries are almost fully met. However both industries have great difficulties in meeting absolute targets.

#### **2.4 The Declaration of German Industry on Global Warming Prevention (DGWP)**

1. The DGWP initiative was launched in 1995 and first published in 1996. The industrial firms signing a voluntary agreement expect that policy will give priority to these agreements against other – more enforcing- instruments.
2. Target groups are energy-intensive branches. The published DGWP is an umbrella declaration of 18 industrial associations in the basic industry and the energy sector. The industrial associations have approximately 4400 members consuming 70% of the industrial energy-use.
3. General targets of the industrial associations is to achieve a 20% reduction of the specific energy use or specific CO<sub>2</sub>-emissions in 2005 compared to 1990 levels.
4. The voluntary agreements are mainly seen as a substitute for other policy measures and are not extensively supported by other policy measures. The implementation takes places entirely under the self-responsibility of the industry.
5. Self-reported progress reports are checked against official statistics. However there is no independent data-collection by a monitoring institute and data are not used to check and analyse the performance of individual firms or revision of the scheme.
6. No sanctions are specified in the standard voluntary agreement.
7. According to progress reports at sector levels target will be met.

#### **2.5 Lessons learned from the voluntary agreements**

Voluntary agreements can have an impact on industrial energy consumption and CO<sub>2</sub>-emissions if they are embedded in broader policy mix, adapted to the specific target group. Voluntary agreements will have higher impacts; when guidelines and ambitious target are set for decision making at firm level and support and incentives are provided to implement energy conservation measures. The trade-off between additional impact on energy-efficiency and implementation efforts is visualised in figure 1.

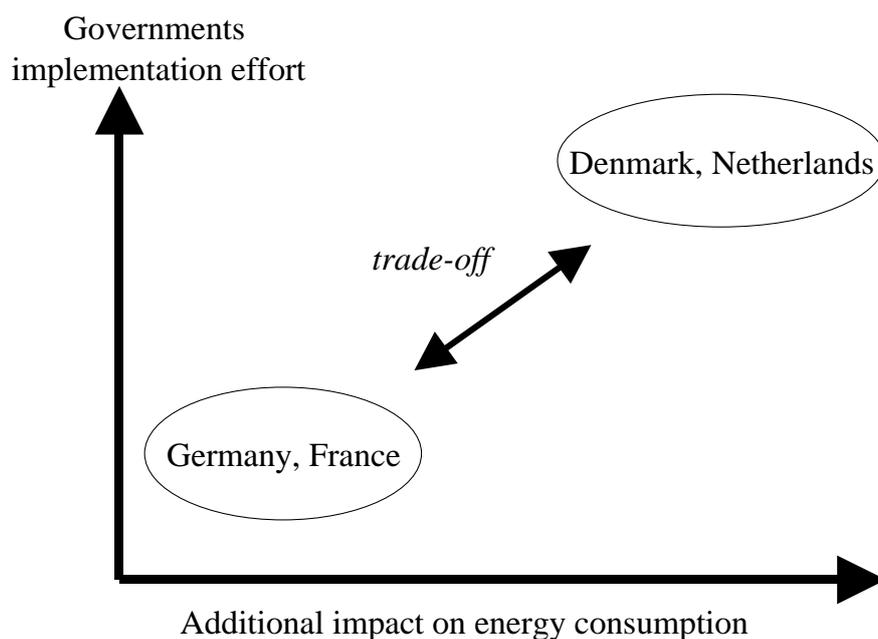


Figure 1: Trade-off between implementation effort and additional impact of agreements-schemes (Krarup and Rameshol, 2000)

### 3 Voluntary agreements within the Netherlands

This paragraph goes further into detail on voluntary agreements in the Netherlands and analyses the effectiveness of these agreements as a policy instrument for industrial energy conservation.

#### 3.1 Background

In the First Memorandum on Energy Conservation in 1990 (EZ, 1990) the Dutch government decided to add voluntary Long Term Agreements (LTAs) with the industry to the policy mix aiming to improve the energy-efficiency of the Dutch industry. The government formulated two important targets regarding the LTAs:

1. Long Term Agreements have to cover 90% of the total industrial energy consumption of the Netherlands.
  2. the energy-efficiency of the industry has to improve by 20% in 2000 compared to 1989 level.
- Target groups for the LTAs are all industrial branches with an energy use over 1 PJ per year. Firms joining an LTA must improve energy-efficiency as far as practically and economically feasible. In return the Dutch government agreed not to introduce new regulation on energy-efficiency and give financial support.

#### 3.2 Process leading to an LTA

The process leading to an LTA can roughly be divided in two phases. The first phase leads to the declaration of intent signed by the Ministry of Economic Affairs and the Branch organisation(s). The declaration of intent only confirms the wish of both parties to come to an agreement. The second phase start with an inventory on energy reduction options within the sector. Results of the inventory are the input to get to a quantitative target for the industrial sector, which forms the key element of the LTA. At the end of the second phase the LTA is signed by the Ministry of Economic Affairs and the Industrial Branch organisation(s) and in some cases co-signed by individual firms. This is the starting point for implementation of the LTA on the individual firm level. Figure 2 illustrates the process leading to an LTA.

### Process on Long Term Agreements

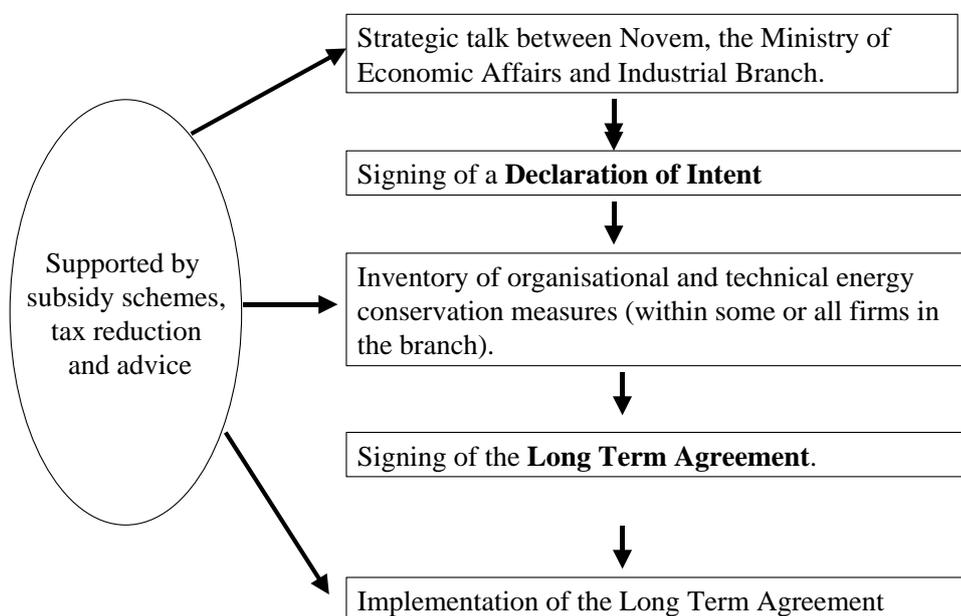


Figure 2: Process on Long Term Agreements in the Netherlands (Glasbergen et al, 1997)

### 3.3 Contents of an LTA

An LTA holds the agreements and obligations for every party signing the LTA. Important elements of an agreement are:

- Target and timetable on the improvement of the energy-efficiency for the industrial branch. General targets set in the LTAs are an energy-efficiency improvement of 20% in 2000 compared to 1989 level. An energy-efficiency improvement of 20% means a reduction of the EEI by 20%.
- Plan of action on how the branch is going to increase their energy-efficiency. The contents of company energy plans and economic viability of the plans have to be added.
- The way in which the agreement will be monitored. Long Term Agreements are monitored by determining the decrease in energy-use per unit of physical product output (the so-called energy-efficiency index (EEI)).

### The Energy-efficiency index (EEI)

The monitoring methodology in the LTAs relates the actual energy consumption in a specific year to the energy that would have been needed if no change in the aggregate specific energy consumption had occurred since the base-year 1989. The actual energy consumption is thus compared with the 1989 *frozen intensity* situation. In formula (for a firm with  $n$  different products):

$$EEI_y = 100 \times \frac{E_y}{E_{ref, y}} = 100 \times \frac{E_y}{\sum_{x=1}^n (P_{x,y} \times SEC_{x, by})}$$

in which:  $EEI_y$  is the EEI in year  $y$ ;  $E_y$  is the actual primary energy consumption in year  $y$ ;  $E_{ref, y}$  is the reference energy consumption for year  $y$ ;  $P_{x, y}$  is the physical production amount of product  $x$  in year  $y$ ; and  $SEC_{x, by}$  is the specific energy consumption of product  $x$  in the base-year ( $by$ ). The factor 100 is introduced for scaling only; by definition the EEI is 100 in the base-year. The EEI of a whole sector is calculated as the ratio of the total actual energy consumption of the firms and the total frozen-intensity energy consumption of the firms. In formula for a sector  $s$  in year  $y$ :

$$EEI_{s, y} = 100 \times \frac{\sum E_y}{\sum E_{ref, y}}$$

- Firms must annually report their results on energy-efficiency improvement to the Dutch energy-agency Novem.
- Reason parties can stop the agreement. Individual firms can be excluded from the LTA if they fail to provide an energy conservation plan and annual monitoring results. Firms will be subject to existing regulations, i.e. environmental permits.

Appendix I offers a checklist for environmental agreements.

### 3.4 Supporting policy measures

Several other policy measures such as subsidy schemes and tax reduction measures (such as the Energy Investment Allowance introduced in 1997) support the LTAs. In the Dutch situation the Dutch energy agency Novem plays a major role when it comes to the implementation of LTAs. Novem is entrusted with the management of the Long Term Agreements. Among others Novem is responsible for:

- making preparations for signing declarations of intent and eventually LTA,
  - supporting industrial branches and individual firms in realising the LTA by giving financial support (subsidy schemes) to carry out feasibility studies, research and development projects and demonstration projects.
  - monitoring of the LTA through verifying the data in the progress reports of the individual firms and drawing up official statistics.
  - support the transfer of knowledge on energy-efficiency improvement between different branches.
- Glasbergen et al (1997) concluded that Novem has a crucial role in the process of implementation of the LTAs and presenting of supporting policy measures.

### 3.5 Results and progress

Up till now 29 LTAs have been concluded in the manufacturing industry and approximately 1250 firm are actually involved in an LTA. The industrial LTA represent about 90% of the industrial energy use by which the first objective of the Memorandum on Energy conservation is reached<sup>3</sup>.

Annually Novem publishes a progress report on the Long Term Agreements. The 29 industrial LTAs resulted in an average improvement in energy efficiency of 17.4% over the period 1989-1998 by which the second target of the Memorandum on Energy conservation seems within reach. Within the industry, however, performance differs and some sectors such as light industry are behind schedule, whereas base metals and chemical industries are well in line with the targets. *Table 1* summarises the energy-efficiency improvements in the individual industrial LTAs up to 1998 (EZ, 1999). As can be noted from this table the chemical industry is of special importance for the aggregated results, because approximately 60% of the total energy consumption in Netherlands' industry can be attributed to the chemical industry.

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<sup>3</sup> Farla and Blok (2000) argue that the coverage is only about 75%. This is due to the fact that in some sectors not all companies participate and that part of the energy use (e.g. in the iron and steel industry) is left out of consideration.

Table 1: Overview of the long-term agreements on energy-efficiency with the manufacturing industry and result for the period 1989-1998 (EZ, 1999.)

LTA sector	LTA Contracting Date <sup>a</sup>	Final year LTA	Energy consumption (PJ) <sup>c</sup> base-year 1998 <sup>b</sup>		Energy Intensity target 1989-2000	Reported results 1989-1998
<b>Basic steel industry</b>						
Iron and steel	1995	2001	61.2	62.1	-20%	-16.3%
Non-ferrous metals	1996	2001	8.4	9.7	-15%	-11.0%
<b>Building materials</b>						
Glass	1992	2000	10.9	12.7	-20%	-14.8%
Cement	1998	2001	5.3	3.3	-20%	-21.0%
Sand-lime brick	1992	2001	1.3	1.2	-23%	-11.7%
Construction ceramics	1993	2000	9.7	9.1	-20%	-11.0%
Fine ceramics	1994	2000	2.7	3.2	-20%	-9.0%
Asphalt	1995	2001	2.3	2.4	-20%	-6%
<b>Chemical industry</b>						
Chemicals	1993	2000	307	321	-20%	-18.5%
<b>Light industry</b>						
Iron foundries	1995	2001	2.3	2.6	-16%	-5.6%
Surface treatment industry	1996	2001	1.6	2.3	-20%	-13.2%
Cold storage/refrigeration	1996	2001	1.5	2.1	-28%	-16.2%
Carpet industry	1996	2001	0.6	1.0	-20%	-13.0%
Industrial laundries	1994	2001	1.6	1.4	-20%	-19.2%
Other industries LTA	1996	2001	12.0	13.6	-20%	-10.8%
<b>Remaining industry</b>						
Plastics processing	1994	2001	7.0	8.4	-20%	-14.6%
Rubber processing	1994	2001	1.7	2.0	-20%	-17.0%
Textile	1996	2001	3.6	3.7	-20%	-16.0%
Paper	1996	2001	30.2	31.7	-20%	-18.5%
Philips	1993	2000	11.0	7.5	-25%	-34%
<b>Food- and beverage industry</b>						
Margarine, oils and fats	1996	2001	7.4	8.3	-22%	-20.5%
Sugar	1993	2001	7.5	6.2	-20%	-21.2%
Meat processing	1993	2000	2.6	4.6	-20%	-10.2%
Breweries	1998	2001	4.0	3.8	-27%	-24.8%
Fruit and vegetables	1997	2001	2.1	2.5	-16.5%	-7.4%
Coffee	1996	2001	0.8	0.7	-19%	-20.5%
Dairy	1998	2001	17.3	17.4	-20%	-11.4%
Potato processors	1996	2001	4.6	8.3	-20%	-17.5%
Soft drinks industry	1996	2001	0.6	0.8	-21%	-14%
<b>Total manufacturing industry</b>						<b>-17.4%</b>

<sup>a</sup> Year at which the last LTA was closed.

<sup>b</sup> The base-year of the long-term agreement is the year with which developments are compared, 1989 in most LTAs.

<sup>c</sup> The energy consumption refers to the primary energy consumption in all the firms that joined the LTA by 1997 (excluding energy consumption for non-energetic purposes). Electricity is converted to primary energy generally on the basis of 40% conversion efficiency.

Glasbergen et al (1997) performed an evaluation study on the Long Term Agreements on energy-efficiency in which they have tried to estimate the contribution of the LTA to the improvement in energy-efficiency. Furthermore they determined the contribution in achieved improvements in energy-efficiency of different type of measures (Table 2). They concluded that approximately 1/3 of the energy-efficiency could be attributed to the LTAs whereas 2/3 is the result of autonomous energy-efficiency improvements.

*Table 2: Estimated contribution of the different measures to the improvement of energy-efficiency.*

Type of measure	Contribution in achieved energy-efficiency improvements (1989-1995)
Good housekeeping	12%
Replacement-investments	21%
Energy-saving -investments	32%
Combined-Heat and Power (CHP)	20%
Remaining measures	16%

### 3.6 Points of attention

In general the LTAs in the Netherlands come up to expectations. However there are some point concerning the Dutch LTAs we would like to bring to notice.

First of all there is the point of monitoring the LTAs on the basis of energy-efficiency indexes (EEI). The EEI is in most LTAs based on physical indicators of energy-efficiency. Most experts agree that this gives a better indication of efficiency-improvements than an indicator based on financial or economic quantity. The main problem with the EEI is that they lack transparency. The EEI is based on the total product mix of a sector as a result of which the EEI can contains a lot of different variables. Besides sectors are allowed to use correction factors when circumstances in the sector change dramatically and they tend to use this factor mainly to correct the EEI in the direction of decreasing energy intensities. The whole process of composing an EEI and the use of correction factors lacks independent verification and leads to differences with official statistics of the Central Bureau of Statistics.

The second point of attention is the light industry. This sector has a high energy saving potential against relatively low costs but is lagging behind on schedule. The sector consists of many companies with a lot different installations and products, which makes it impossible to approach the firm individually. For these sectors the LTA's have not yet proved their value and it might be wiser to look for other instruments.

Finally we would like to bring up the point on the level of ambition of the LTA. All LTAs (with some exceptions) opted for the 20% energy-efficiency improvement. No distinction was made between sectors on the basis of cost-effectiveness or application of the ALARA (As Low As Reasonably Achievable) principle.

### 3.7 Revision of policy targets and instruments

In 2000 most LTAs expire and the Third Memorandum on Energy (EZ, 1998) announced several changes for the new LTAs to set up. Such as:

- The ambition of the energy-efficiency targets will be increased to 2.2% per year instead of the 2.0 % in the old LTAs.
- Certain aspects such as energy-efficient product design, renewables and material flows will be incorporated in the new agreements.
- The LTAs will be pursued on a more individual basis instead of general agreements with industrial branches.

Agreements with the sector on these new LTAs have not been reached yet. Furthermore for high energy-intensive firms (energy consumption >0.5 PJ a year) a new type of agreement is reached: the Benchmark agreement. Under this agreement companies aim for their plants to become (and remain) among the most efficient as soon as possible, but not later than 2012 (Phylipsen, 2000).

#### **4 Conclusions and recommendations**

The experience with voluntary agreements in some countries of the European Union indicates that such agreements can help limiting the growth of energy use in manufacturing industry. The positive and negative experiences obtained up to now lead us to the following set of recommendations for the design of successful voluntary agreements.

1. Voluntary agreements require a clear negotiation position and a negotiating attitude of the government in order to reach ambitious targets.
2. The targets should be well described with respect to energy efficiency target and target year.
3. Voluntary agreements require an intensive and long-lasting effort of the government to guarantee the actual realization of the energy efficiency improvement. Such additional effort can consist of support of the branch, free energy audits, organization of information exchange and subsidies for demonstration projects.
4. Monitoring of the improvement of the energy efficiency improvement should be done by using physical energy efficiency indicators (e.g. GJ/tonne of product).
5. The monitoring guidelines should be clearly described and the monitoring procedure for each sector should be public. The use of correction factors should be limited.
6. Independent verification of the monitoring results is necessary.
7. Voluntary agreements are mainly successful for energy-intensive sectors with only a limited number of companies involved.

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## **Appendix I: Checklist for Environmental Agreements (EU, 1996)**

The communication on Environmental Agreements issued by the European Commission (EC, 1996) provides guidelines for negotiated agreements. As a part of these guidelines a checklist for environmental agreements was drawn up.

### **I Reason for the choice of the instrument**

- 1 Advantages compared to legislative and economic measures.
- 2 Sector coverage, strength and business associations
- 3 Public awareness of the issue
- 4 Previous involvement of legislator in setting objectives.

### **II Content**

- 1 Parties to the agreement (associations and individual firms)
- 2 Subject
- 3 Definition of terms
- 4 Quantified objectives
- 5 Staged approach
- 6 Specification of obligations
- 7 Monitoring of results
- 8 Periodic reporting
- 9 Access to information
- 10 Arrangements for collection/evaluation/verification of results
- 11 Sanctions
- 12 Accession of third parties
- 13 Duration
- 14 Revision
- 15 Termination
- 16 Legal nature of the agreement
- 17 Jurisdiction

### **III Publication**