

Voluntary Agreements in Energy Policy – Implementation and Efficiency

Final Report from the project
Voluntary Agreements – Implementation and Efficiency (VAIE)

by

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Preface

The VAIE project (Voluntary Agreements – Implementation and Efficiency) investigates the conditions under which voluntary agreements can be expected to achieve environmental targets in an efficient way. This has been carried out through developing models based on economic theory, case studies of voluntary agreements in five countries, an analysis of the actual outcome of the voluntary agreements in relation to the baseline, and finally an analysis of the role of EU vis-à-vis the Member States regarding execution of voluntary agreements in Member States and at EU level.

VAIE is supported by »DG XII; Science, Research and Development« through the »JOULE Programme« (Contract No JOS3-CT97-0021). Several national institutions have also financially supported the project. The project began February 1998 and ends by February 2000. Sixteen researchers and project assistants from five institutions have co-operated in the project. The scientific officer from the European Commission is Domenico Rossetti di Valdalbero.

The report in your hand is the final report from the project. It is based on nine reports from the project: Chidiak (forthcoming), Chidiak et al. (1999), Helby (forthcoming), Johannsen & Larsen (forthcoming) Kræmer & Hansen (1999), Kågström et al. (forthcoming), Ramesohl & Kristof (forthcoming), Rietbergen et al. (forthcoming) and Rietbergen & Blok (1999).

A draft of this report has been discussed in an expert review with as well researchers as policy makers. We appreciate very much the remarks to the draft we received at the expert review from Otto Starzer (Energieverwertungsagentur E.V.A., Austria); Edoardo Croci (IEFE – Università Commerciale Luigi Bocconi, Italy); Martin Patel (Fraunhofer Institut für Systemanalyse und Innovationsforschung, Abteilung Energie, Germany); Niels O. Gram (The Confederation of Danish Industries) and Joachim Hein (Bundesverband der Deutschen Industrie (BDI), Abteilung Umweltpolitik, Germany).

Anders Larsen
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1 Introduction

The 5th Environmental Action Programme »Towards Sustainability« adopted in 1992 encourages a new policy approach to move towards sustainability. Besides market-based instruments, the promotion of voluntary initiatives and agreements is considered a key component of the new approach. This project about Voluntary Agreements – Implementation and Efficiency (VAIE) should be seen in line with the new political focus on voluntary approaches and their increased use worldwide.

This report summarizes the findings and the work carried out within the VAIE-project, which examined five agreement schemes: the Swedish ECO-Energy, the Danish Agreements on Industrial Energy Efficiency, the Dutch Long-Term Agreements on Energy Efficiency, the Declaration of German Industry on Global Warming Prevention, and the French Voluntary Agreements on CO₂-Reductions.

The report should serve as a stand-alone report, and is addressed at our dissemination target group from EU and national politics, industry, NGO and research. It should provide a quick, but nonetheless comprehensive, overview of the VAIE-project findings, and give answers to the following questions relevant to the policy discussion:

1. What are the characteristic features of the five agreement schemes studied?
2. How do they work and what is their impact on industrial energy use and CO₂-emissions?
3. What is the future role of voluntary agreements in energy and climate policy?

Within the project we have looked into agreements at different levels of implementation: from the choice of agreements at the political level, over the commitment by industrial associations or firms, down to the activities carried out at firm level. Therefore, it has been necessary to specify more clearly the terms of voluntary agreements.

When we talk about an agreement scheme we refer to agreements used as a policy instrument in the national policies. This is the object of research in the following. Using the term voluntary agreements we refer to specific examples of either an individual or a collective agreement under a national agreement scheme.

The agreement scheme provides the frame and it specifies the conditions under which voluntary agreements can be implemented in the country. In this study, we concentrate on voluntary agreements as commitments by individual firms or industrial branch organizations, dedicated to increase energy efficiency or to reduce CO₂-emissions.¹

The commitment is the result of negotiations with public authorities or the commitment is explicitly recognized by the authorities. Other voluntary approaches, such as unilateral declared codes of conduct, fall outside the project.

Content of the Project

The project has been organized in different tasks, which followed four quite different approaches to the analysis of agreements.²

Task A follows an economic approach, and here three theoretic models on voluntary agreements are presented.³ The models are confronted with a meta-analysis based on existing investigations of agreements. The goal is to point to central actors in the policy-making and implementation processes, and to discuss ways of distributing knowledge and information among the actors. Given the analytical advantages and disadvantages of economics simplifying assumptions, the analysis derives the welfare implications of agreements.

Task B describes the methodological framework for the country studies⁴ undertaken as Task C. The five country studies in Denmark, France, Germany, the Netherlands, and Sweden are based on case studies of agreement schemes and voluntary agreements.⁵ The objective was primarily to identify impact mechanisms at firm level in relation to the implementation process

of agreement schemes respectively the voluntary agreements.

Different methodologies to assess the actual outcome of agreements and the non-intervention case are described in Task D.⁶ The other tasks in the project, especially the country studies and task A, are discussed in task E from an EU perspective, focussing on the question of implementing agreement schemes at the EU level.⁷

The results from each task are published in separate reports, but are summarized in the following chapters. The five agreement schemes studied will be described and compared, followed by a discussion of their performance. Here the additional impacts of the agreements will be compared to the efforts firms and the public agencies have put into the implementation of the agreements. Also requirements for effective agreement schemes will be put up, as guidelines for transferability of agreements across countries and to the EU level. In the end, we will give some conclusions and policy recommendations from the different tasks carried out within the project.

Notes

1. A variety of studies of voluntary agreements and approaches exists. For more information on classifications and types of voluntary agreements, see, e.g., Ekins (1998), European Environment Agency (1997), OECD/IEA (1997), Segerson & Li (1998), Carraro & Lévêque (1999), OECD (1999).
2. See www.akf.dk/vaie
3. See Chidiak (forthcoming) or www.akf.dk/vaie/task A
4. For details see Kræmer & Hansen (1999).
5. See Chidiak (forthcoming), Kågström et al. (forthcoming), Ramesohl & Kristof (forthcoming), Johannsen & Larsen (forthcoming) and Rietbergen et al. (forthcoming).
6. See Rietbergen & Blok (1999).
7. See Helby (forthcoming).

2 **A Comparative Characterisation of Agreements**

To give an overview of the similarities and differences between the different types of agreements, some of the main characteristics are summarized in the following.¹ This chapter describes the findings, and discusses the similarities and differences among the five types of agreements.

2.1 **A Brief Profile of the Five Agreement Schemes**

In the following the main characteristics of the five agreement schemes are summarized. The descriptions show the diversity of agreements. Using criteria such as structure, complexity and coverage, the agreement schemes can be categorized in mainly three groups. It should be mentioned that in defiance of this categorisation, many differences could be found among the schemes within the same group.

One group is the Dutch and Danish schemes with rather structured and elaborated procedures. The second group contains the French and German schemes, with less structure and more openness for implementation. The third group covers the Swedish scheme, which also has a low degree of structure and complexity. The difference to the second group is that this scheme has a small target group and no negotiations about targets have taken place. The schemes in the second and third group are more like a type of gentlemen's agreement, with limited, if any, legal implications.

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

After the first negotiations on energy-related voluntary agreements in the early 1990s, the DGWP initiative was launched by the German government

a few weeks before the first Conference of the Parties (COP1) to the UNFCCC in Berlin in March 1995. Triggered by an urgent need to present national activities to the international public, the preparation and negotiation phase of the first version of the DGWP was characterized by extreme time pressure, and an assessment of potentials and baselines did not take place. The first version (BDI, 1995) received severe criticism, and a partially updated version was published in March 1996 (BDI 1996a). From there on, no further corrections have been made to the declaration and the related procedures.

The DGWP is published as an umbrella declaration by 18 industrial associations mainly from the basic industries and the energy sector, and it covers approx. 70% of industrial energy consumption and almost all public electricity generation. The DGWP expresses the industry's willingness to undertake extraordinary efforts on a voluntary basis in order to achieve a reduction of 20% of the total industry's specific energy consumption and/or of specific CO₂-emissions until the year 2005 (base year 1990). Under the umbrella declaration, the participating branch associations published their own declarations with branch-specific targets, which deviate – sometimes significantly – from the common goal.

In exchange for their unilateral declarations, which lack any legally binding commitment, the industrial associations expect that policy will give priority to these voluntary initiatives against other regulatory or fiscal climate policy instruments. In 1995, the federal government announced via a press release the withdrawal of plans to introduce a waste heat ordinance and promised an exemption from a possible energy tax. This intention was clarified and assured in 1996 (Bundesregierung 1995, 1996). The political reply did not provide any legal commitment.

The implementation of the DGWP takes place entirely under the self-responsibility of the industry, and the branch associations are in charge of implementing their own declaration. A formal obligation such as a letter-of-intent by firms does not exist, so there is no formal power to enforce concrete action at firm level.

The Rheinisch-Westfälisches Institut für Wirtschaftsforschung (RWI, Essen) was entrusted to carry out an annual sector-by-sector monitoring on the basis of progress reports provided by the branch associations (BDI 1996a). The self-reported data are checked against official statistics. How-

ever, an independent data collection by the monitoring institute and a comprehensive assessment of structural effects, autonomous driving forces for industrial energy efficiency etc. do not take place.

Up to now, two monitoring reports have been published which point at significant deficiencies of the scheme (RWI 1997, 1999). This criticism, however, has not resulted in an official modification of targets and procedures, although both the political and industrial party explicitly refers to the dynamic nature of the DGWP as a policy learning process. In late 1998, the process was stalled due to the shift of governmental power, and the introduction of an ecological tax reform. At the time of this study (summer 1999) the scheme was still pending, but a continuation of the annual monitoring procedures was envisaged.

2.1.2 **The Danish Agreement on Industrial Energy Efficiency**

The Danish agreement scheme on energy efficiency in industry is part of a policy mix combining voluntary agreements, SO₂- and CO₂-taxes and subsidies for both energy efficiency counselling and investments. The most important incentive for the companies to enter into an agreement is a substantial CO₂-tax rebate. The reduction of the CO₂-emissions resulting from the CO₂-package (CO₂- and SO₂-taxes, investment grants and agreements) is expected to be 4.4% of the Danish CO₂-emissions in relation to their 1988 level by the year 2005.

The target group for the Danish CO₂-agreement scheme is energy-intensive companies. Agreements can be either individual (covering a single plant) or collective (covering several companies within a subsector). The idea of the collective agreements is to reduce administrative costs of entering an agreement, but individual agreements are by far the most common arrangement. The agreements entered in 1996, 1997 and 1998 cover approximately 150 industrial companies and 100 greenhouses.

The basis of individual agreements is an energy audit, generally carried out by a consultant certified by the Danish Energy Agency. The audit report must include mapping of the energy consumption at the plant, a list of identified potentials for energy efficiency improvements and suggestions for special investigations to be carried out. The report must be verified by an independent agency assisted by a technical expert. The companies bear the costs of the audit and the verification, but subsidies of up to 50% of the

costs can be granted from the Danish Energy Agency. The collective agreements are not based on energy audits performed in the individual companies. Instead, an analysis of energy consumption and production processes in the sector is made to identify general potentials for improving energy efficiency in the companies.

On the basis of the audit report an action programme is made for the plant. As a general rule, all energy efficiency projects with a payback period of less than four years must be carried out as part of the plan. However, during the negotiations the company and the Danish Energy Agency can decide that alternative projects replace some of the »obligatory« projects. In addition, the company must describe and implement an energy management system including energy accounting, procedures for energy efficient procurement, appointment of an energy manager and education and motivation of staff.

When the agreement is signed, the company must carry out the projects and investigations listed in the action programme and implement the energy management system. Every year the company must deliver a progress report to the Danish Energy Agency. In this report the fulfilment of the agreement must be reported together with a status for the energy management. If companies fail to meet the obligations in the agreement, the Danish Energy Agency can cancel the agreement, and the tax rebate will be annulled.

2.1.3 **The French Voluntary Agreements on CO₂-Reductions**

The French agreement scheme on CO₂-reduction was designed to make a contribution to the attainment of the Rio commitments (i.e. to stabilise CO₂-emissions at 1990 levels by 2000). In this framework, the National Programme for the Prevention of Climate Change (February 1995) adopted a consensus and dialogue approach (through voluntary agreements) towards energy-intensive industrial branches in order to limit the competitive effects of carbon reduction policies (i.e. by a tax).

After a first round of negotiations involving mainly the Ministry of the Environment with energy-intensive firms and branch associations, the Ministry of the Environment sets a common »voluntary agreement procedure«. In order to conclude a voluntary agreement firms or branch associations had to: i) provide background information on energy consumption and CO₂-emissions between 1990-1994; ii) set objectives of CO₂-emissions and

thermal energy consumption reductions (in specific and if possible in absolute terms) for the period 1990-2000 (and discuss, but not commit to »technically and economically feasible« energy savings or substitution measures to reach these goals), and iii) sign a »standard voluntary agreement text«, clearly indicating the activities and firms covered by the agreement, the evolution of past emissions, a global objective and timetable of reduction commitments up to the year 2000, and annual self-reporting provisions at branch level. In addition, the standard text quotes the French government memorandum of 21 March 1994 stating that no carbon taxation would be applied towards industry in view of the Rio commitments, in order to avoid undesirable de-localisation effects.

It is noteworthy that no sanctions were specified in the standard voluntary agreement text (and under the French constitution, such a contract would not be enforceable), and neither was third party monitoring provision included.

Under the agreement scheme, seven voluntary agreements have been concluded with the aluminium (Pechiney), steel, fat and magnesia lime, plaster, cement, and packaging glass industries. In addition, two transport-related emission agreements were signed with the automobile industry (Peugeot/Citroën and Renault, mainly a product-related voluntary agreement regarding car CO₂-emissions), and 3 Suisses (a direct marketing firm, concerning emissions from transport and delivery). This means that many negotiations were stalled in the process, as other energy-intensive industries were involved in negotiations at an early stage: chlorine-soda (Rhône-Poulenc and Atochem), foundries, paper and pulp, dairy and sugar producers.

2.1.4 **The Dutch Long-Term Agreements on Energy Efficiency (LTAs)**

As response to new ideas on co-operative environmental management LTAs were introduced in the early nineties. Since the introduction of the Second Memorandum on Energy Conservation in 1993 the LTAs have become the main policy instrument for industrial energy conservation and industrial CO₂-emission reduction. The CO₂-emission reduction objective for the total economy, aims at 3-5% reduction in 2000 compared with 1989. The objective of the agreements is to improve industrial energy efficiency without a

negative effect on economic growth or the competitiveness of Dutch trade and industry. The LTA programme is supported by several additional policy measures, like monitoring, subsidy schemes, tax reduction and information services. The executive responsibility of the LTA programme has been delegated to the Dutch energy agency, Novem. Novem has several stimulating and facilitating tasks as well as verifying responsibilities in the LTA programme.

By signing an LTA, the industrial branches agree to achieve an energy-efficiency improvement of, e.g. 20% in year 2000 compared with the level in 1989. Firms that join the sectoral LTA should improve energy efficiency as far as practically and economically achievable to contribute to the achievement of the collective target. In return, the government agrees not to introduce new regulations on energy conservation and it gives financial support to the LTA programme.

The process leading to the conclusion of the sector LTAs begins with strategic talks between the Ministry of Economic Affairs, the branch association and Novem. An exploratory survey is conducted to investigate the organizational and technical options for energy conservation in the sector. The negotiations of the agreement mainly deal with the formulation of the obligations and commitments of parties involved. When the LTA is signed, 80% of the member firms have to declare their individual commitment by a letter of intent, which includes the obligation to prepare an Energy Conservation Plan, which contains the firm's individual strategy to energy conservation. After Novem's approval and the issuance of an environmental permit the firm can start implementing its plans. The firm must report the results to the branch association annually. Novem verifies the sector results as well as the individual firm's results. In case of non-compliance an LTA can also be terminated. Individual firms can be excluded from the LTA if they fail to provide an energy conservation plan and annual monitoring results. The firms will be subjected to the existing regulation, i.e. the environmental permit.

Up till now 30 industrial LTAs have been concluded. The LTAs cover about 90% of the total industrial energy consumption in the Netherlands. In 1998, the average energy efficiency improvement of the 30 industrial LTAs amounted to about 17.4% compared with the 1989 level.

2.1.5 The Swedish ECO-Energy

The Swedish agreement scheme was a specialized effort aimed at preparing companies for EMAS and ISO 14001 certification.²

Companies have committed themselves to

- formulate an environmental policy,
- long-range energy saving goals,
- firmly establish energy savings as a goal at all levels of the organization,
- establish a plan of action concerning energy efficiency measures,
- accomplish a verifiable increase in energy efficiency,
- use energy efficiency standards in the procurement activities.

In return, they basically receive a free energy audit and other kinds of help with the certification process, as well as some publicity and the right to use the ECO-Energy label in their marketing.

The scheme was targeted at companies specifically interested in this package, rather than any specific sectors of industry. Agreements were made directly between companies and authorities, without any involvement of industrial organizations. The scheme was commenced in 1994 and terminated in 1999, when the certification process was assumed to have gained sufficient momentum to proceed without further public involvement. A total of some 30 companies were involved, large as well as small. There was no clear concentration in specific industries.

The scheme was decided and implemented at the administrative level, without involvement of the political level (government, parliament), and without negotiations with industrial organizations. The funds came from general budget allocations for CO₂-reduction and energy efficiency measures meant to support Swedish compliance with the Rio commitments.

The scheme was based on the internal goal-setting and self-control mechanisms that are required for EMAS and ISO 14001 certification. It involved no additional public controls or sanctions.

ECO-Energy was terminated in the summer 1999, pending a general review of Swedish climate change policy. This review is now in the hands of a parliamentary commission. No official assessment of the programme has been made.

2.2 Voluntary Agreements in a Policy Mix

The Context

In all five countries, energy efficiency in industrial processes has been the focus in the countries' energy policy for many years. However, the implementation of energy-related agreements is also seen as part of the countries' commitment to reduce CO₂-emissions (table 2.1). Agreements with targets such as improved energy efficiency or CO₂-reductions are measures to reduce the industry's contribution to the overall CO₂-emissions. However, in none of the countries a CO₂-reduction target has been set for the whole industrial sector before the negotiation process of the agreements.

Table 2.1 Total national commitment

	National commitments to CO ₂ -reductions
Denmark	20% reduction between 1988-2005
The Netherlands	Stabilise emissions at 1989 level by 1995 and 3-5% reduction by 2000
Germany	25% reduction between 1990-2005
Sweden	Stabilise emissions at 1990 level by 2000
France	Stabilise emissions at 1990 level by 2000

Energy Policy Background

In most countries, the introduction of agreements meets other policy measures to affect industry's energy use, which are already taking place, or are introduced at the same time. Table 2.2 lists some of the measures taken in the countries considered.

Table 2.2 Examples of supporting measures to promote energy efficiency in industry

Denmark	CO ₂ -tax, free electricity audits, information, subsidies for energy-efficient investments, energy management & accounting.
The Netherlands	Information & consultancy, energy management, investment subsidies, demonstration, other Novem programmes.
Germany	Subsidies mainly directed to SME, energy tax (since 1999), labelling.
Sweden	CO ₂ -tax, subsidies to R&D and procurement programmes, labelling, testing and information dissemination.
France	Mandatory energy audits, subsidies to investments & audits, information dissemination.

The intended role of agreement schemes in this policy mix differs from country to country. In France and Germany the schemes have been seen as a substitute for other policy measures. At least until the energy tax was introduced in Germany in 1999. Here the agreements are sort of stand-alone measures. In Denmark and the Netherlands the role of agreements is very well articulated in the policy mix. In Denmark the CO₂-tax is linked to the agreement scheme, whereas this is not the case in Sweden and Germany. In the Netherlands the agreement scheme is linked to the environmental permit system. In Sweden the ECO-Energy programme complements other measures emphasising the role of EMAS and the formulation of environmental policies at firms.

The provision of information to industry or energy audits of firms seems to be a common element in national energy policies, and in some cases it is even a formalized part of the agreement, as in the Danish, Swedish and Dutch schemes. The use of subsidies for energy-efficient investments or R&D also exists in all five countries, but is not a direct part of the agreements.

Motives

The purpose of introducing agreements can be summarized by the motives of the government and the industry. In general, there have been *no divergent interests* in the government and industry in introducing agreements:

- The governments wanted to find measures to promote increased energy efficiency and CO₂-reductions in industry, i.e. to *support environmental protection, but without overburdening the firms*. Especially a concern for the energy-intensive branches and their international competitiveness has been the reason for the involvement of such sectors in the agreements. Further, the purpose was also to start a dialogue with industry. Inspirations from other countries using agreements or the use of agreements in other sectors in the country have also been a motivating factor.
- From industry's point of view, there was a *fear that the search for climate change policies* would result in an introduction of CO₂-taxes either at a national or at EU level, i.e. industry aimed to avoid more coercive measures. However, industry was also aware of the need to find measures to comply with the overall targets of CO₂-reduction. In Den-

mark, CO₂-taxes were already introduced, so the introduction of agreements was a way to exempt energy-intensive firms from paying the full CO₂-tax, when the tax was increased.

Communication and Negotiation

In all countries the introduction of agreements built on existing communication and dialogue between the industry and the government. This relationship both concerns the policy formulation of energy policy, but also a subsequent exchange of information in the implementation stage. This shows that the communication channels between the industry and the governmental agencies are already established.

In the Swedish case there have been no negotiations between the firms and the public agency. However, firms have had frequent contact with people from the agency in the implementation of more individual measures within the agreement frame. The Danish and Dutch schemes are characterized by a close and frequent contact with the public agency before the firms signed the agreements. Here the purpose has been to identify energy-saving potentials and setting of targets for individual firms and/or branch associations. The negotiations in the German and French cases concerned the target setting at a sectoral level.

Actor Involvement

In the policy process where negotiations about the content in the agreements take place, it is only the industry and a public governmental agency that are involved. Environmental or consumer interests have not been involved in the negotiations and the setting of the targets in the agreements. In the Danish case the industrial organizations have to some extent influenced the choice of agreements as a way to except energy intensive firms to pay a full CO₂-tax.

Besides Germany, the countries also have responsible governmental agencies in place. Looking at the agencies' financial and personnel resources, evaluation results etc. it seems as if the agencies are able to cope with different policy measures towards industry. When the agencies have limited technical expertise, the co-operation is elaborated with a third part, e.g., auditing consultants. In the Danish, Dutch and Swedish schemes consultants are involved to carry out audits of the energy-saving potentials

in the firms. Supervisors are also involved in the Danish case to validate the information in the audit reports, and in the Dutch case a consultative board is involved in the monitoring process. In the Swedish case, EMAS and ISO14001 certification requires the involvement of certifying agencies.

2.3 Target Group and Coverage

In all five countries, the target group for agreements is *energy-intensive industries* such as chemical, iron and steel, pulp and paper, non-ferrous metal. Table 2.3 shows that the schemes differ with respect to their coverage. In the Dutch case 1250 firms are involved covering 90% of the total industrial energy consumption. At the other end of the scale are the Swedish agreements with 30 firms covering only a small share of the industrial energy consumption. This also means that the subsequent effects of the schemes on overall energy efficiency and CO₂-reductions differ.

Table 2.3 The coverage of the agreement schemes

	Target group	Number of firms actually involved	% of industrial energy consumption
Denmark	Highly energy-intensive firms	143 ¹	45%
Sweden	Innovative firms with scope for improving energy efficiency	30	1.5% ²
Germany ³	Energy-intensive branches	Approx. 4400	70%
France	Energy-intensive branches	33	<40%
The Netherlands	All industrial branches with energy consumption of more than 1 PJ per branch	Approx. 1250	90% ⁴

1 This figure only covers the agreements in 1996 and 1997.

2 See Krarup & Larsen (1998).

3 Estimations based on membership in participating industrial associations.

4 According to EZ (1999).

2.4 Types of Targets

The targets in the agreements cover targets for energy savings or efficiency (all countries), CO₂-reduction (the French and German cases) and other environmental areas (the French case). *These targets are both quantitative, e.g. relative energy saving or CO₂-reductions, or qualitative, e.g. concerning procedures for implementation of energy management or investments.*³ In the Danish and Swedish cases the targets are qualitative, where no overall quantitative improvement target has been settled. In the German, French and Dutch cases, quantitative targets have been settled for branches with different (and sometimes unclear) obligations for the individual firms. The type of targets is summarized in table 2.4.

Table 2.4 Type of targets in the agreements

Denmark	Pursuit of special investigations, realisation of specific investment projects (with a payback period up to 4 years), and introduction of energy-management systems.
Sweden	Implementation of energy-management systems (the targets correspond exactly to the organizational development required for EMAS and ISO 14001 certification, but certification is not a formal requirement in the agreement).
Germany	Announcement by industry to undertake an extraordinary effort to achieve 20% reduction of the total industry's specific energy consumption and/or specific CO ₂ -emissions from 1990 to 2005.
France	<i>Packaging glass industry:</i> 10% (27%) reduction in absolute (specific) CO ₂ -emissions from 1990 to 2005. <i>Aluminium industry:</i> 2% increase in absolute and 19% reduction in specific CO ₂ -emissions from 1990 to 2000. 63% (73%) reduction in overall (specific) CF ₄ -emission.
The Netherlands	Energy-efficiency improvement of 20% (with some exceptions) in 2000 compared with 1989.

Target Preparation and Setting

None of the five agreement schemes is based on a publicly available estimation of the business-as-usual development of industrial energy efficiency and CO₂-emissions at the national level, but on internal discussions between industry and the political parties. However, as an exceptional example an ex ante evaluation has been carried out in Denmark showing that the total

CO₂-emission in the firms covered by the agreements will decrease by 6% in the year 2005. Here it is assumed that the firms have an unchanged production within this period and that the responsible agency secures compliance (Finansministeriet, 1999).

At company level, in the Dutch, Swedish and Danish cases, energy audits have been carried out in firms that wanted to participate in an agreement. In the Dutch case, this is only the case for bigger firms. The purpose was here to uncover the energy-saving potentials in the firms in order to set targets for firms or branches correspondent to their performance. In the French and German cases no such assessment has been carried out meaning that the negotiations were based exclusively on already existing information and offers from the industry.

The country studies show that in all cases the agreements allow for a flexible target setting, i.e. a large freedom for industry to define their goals in relation to the political ambitions. In the French and German agreements, targets are mainly set by the industry with governmental approval. In the Danish case the energy audits and the negotiations between the agency and firms have been decisive for the target setting, with consideration to firm conditions. Within the Dutch case the setting of the targets takes branch as well as firm conditions into consideration. In the Swedish case the firms had no formal influence on the target setting, as all targets are preset by the governmental agency. So Swedish firms have as much flexibility in target setting as allowed by EMAS and ISO 14001 standards.

Accordingly, flexibility is understood in a dual sense. On the one side, firms are able to find their own ways to achieve the quantitative targets in the agreements in France, the Netherlands and Germany. In this case flexibility is related to the firms' choice of measures to comply with the targets in the agreements. On the other hand, in the Swedish and Danish cases the targets are more qualitative, e.g., they demand the implementation of procedures and projects. Here flexibility results from the firms' ability to implement procedures that correspond with the particular conditions and management practices in each firm.

Distribution of Responsibilities under a Collective Scheme

In the Dutch case agreements are settled with branches, but each firm within the branches is obliged to draw up an Energy Conservation Plan, which is

assessed by the responsible agency. Hereby the problem with free-riding firms within a branch is diminished. Contrasting the Dutch approach, a formal determination of how to share the responsibilities between the participating firms and their branch organization is missing in the German and French cases. The agreements do not specify formal commitment for the individual firms, and neither the role of the branch association nor the firms' commitment has been clarified. In the German case the burden sharing between sectors, and among the firms within a sector, builds on informal mechanisms. The association's commitment is usually authorized by a committee assembling the most important member firms that contribute the largest part to the sector performance. Under these conditions, the practical implications of the sectoral agreements for the single firm basically depend on internal communication and peer pressure. Formal measures to avoid problems with free riders in the German and French cases are not taken.

2.5 **Implementation**

The implementation of agreements consists of many steps: the implementation of new investment projects, energy management systems etc., the monitoring and evaluation of the industrial performance, and in some cases the use of enforcement mechanism in cases where the firms do not comply with their agreements. In the country studies many differences among the implementation of the five agreement schemes can be found.

Supportive Measures

In order to achieve the targets in the agreements, firms introduce energy-management systems, realise specific investment projects, undertake organizational changes etc. This could both be the target in itself (as in the Swedish and Danish cases) and measures undertaken in order to achieve the quantitative target of the agreements (the Dutch, German and French cases). In the Danish and Dutch cases, firms are supported by other measures in their implementation of the agreements. Firms in Denmark can get subsidies and consultancy for their investments, and in the Netherlands firms can both get investment subsidies, information, consultancy and support by other

Novem programmes. However, all these supporting measures are also available for firms not involved in the agreements. A more soft supporting measure can be found in Sweden as the public agency gives a yearly ECO-Energy award to the best performing firm.

In France and Germany few supporting measures exist. In France the lack of co-ordination and synergies between the agreement and other energy-efficiency promotion activities to enhance CO₂-reductions in industry is stressed as a clear weakness in the implementation process.

Enforcement

The schemes also differ with respect to the enforcement measures. Only in the Dutch and Danish schemes formal sanctions in case of non-compliance with the agreements are part of the scheme. In the Danish scheme firms that do not comply have to pay back the CO₂-tax rebate. All Dutch firms must have an environmental permit. However, for firms with an LTA the licensing authority will only include a reporting requirement and requirements to implement all »certain« energy-conservation measures in case the firms meet the LTA requirements. So in case the firms are expelled from the LTA, the licensing authorities can impose stricter requirements on the firms, than in the LTA.

Apart from these specific formal sanctions, a general and more informal inducement to compliance with the agreement can be found in all countries. In addition to incentives by improving the green image of firms, the threat of a CO₂-tax at the national or EU level has promoted firms to comply with their agreements.

A peculiar, more indirect sanction often used in the Danish case, is the threat to auditors to lose their auditing permit if they do not perform well according to the audit standard. As a first step, auditors get on an observation list, and so far, eight auditors are on the list. These auditors can still perform audits, but their reports are submitted to a kind of peer review.

Monitoring and Evaluation

The agreement schemes are also different with regard to the different steps within the monitoring systems. In table 2.5 these steps are considered for the five schemes.

Table Steps of monitoring

2.5

	The Netherlands	Denmark	Sweden	Germany	France
Firms' or branches' self-reporting	Yes	Yes	Yes	Yes	Yes
Data are collected by the governmental agency or draw on official statistics	Yes	Yes	No	Yes	Yes
Data are checked and analysed	Yes	Yes	No	Yes	No
Utilisation of data: * Use for evaluation of single firm performance * Explicit use for revision of scheme	Yes No	Yes Yes	No No	No No ¹	No No

1 In the German case, two monitoring reports have been published since 1996. An official revision did not yet take place, but modifications are envisaged.

In all countries, the self-reported information is used to evaluate the implementation progress and the degree of target achievement by sectors or firms. However, only in the Danish and Dutch cases the information has been used to give feedback to individual firms, e.g. to guide or enforce non-complying firms to undertake stronger efforts to comply with the targets and commitments. In the Danish case, losing the tax rebate sanctioned one firm. In the Netherlands, up to now 45-50 industrial firms have terminated their LTA contract. The number includes both firms that left the LTA of their own accord, and firms that have been expelled from the LTA, because they did not meet the obligations in the contract.⁴

With regard to the use of monitoring data in the policy process, the Danish scheme has already gone through a revision, which was triggered by the information about the working and effects of the schemes. In the Dutch scheme only small modifications in the LTA can be seen, but these changes are not due to the monitoring of the agreements, but other kinds of external policy evaluations. By contrast, in the French and German schemes the monitoring experiences have not yet induced changes in the agreement schemes. In particular, in Germany political reactions and operational consequences to the questions raised by the first two monitoring reports are still missing. Modifications, however, are envisaged for the next round. The

Swedish ECO-Energy programme was terminated in the summer 1999, but no official assessment of the programme has been made.

The different ways to handle and respond to the monitoring information reflect the different policy philosophies and target ambitions, but are probably also due to the differences in manpower and expertise in the agencies responsible for the schemes. For example, the relationship between manpower and the number of firms covered in the schemes differs. In Denmark, two offices administer the agreement scheme, whereas one researcher in an independent institute compiles all data within the German scheme. Obviously, the monitoring effort in the two schemes is closely linked to the administrations behind the schemes. Moreover, in the Danish case external consultants and auditors are regularly involved, both in defining and monitoring the agreements, when the expertise available to public agencies is not sufficient or an independent judgement is necessary.

2.6 Three Profiles

The country studies have shown a huge diversity in the design and implementation practice of agreements, which might reflect partly the country specific conditions, partly the agreements' ability to adapt to firm or branch characteristics. From our characterisation we derive three different profiles, which will be described more detailed in chapter 3:

- the Dutch and Danish agreement schemes
- the French and German agreement schemes
- the Swedish agreement scheme.

Notes

1. For more detailed information about the schemes see Chidiak (forthcoming), Kågström et al. (forthcoming), Ramesohl & Kristof (forthcoming), Johannsen & Larsen (forthcoming) and Rietbergen et al. (forthcoming) and appendix A in Helby (forthcoming).
2. EMAS is an EU standard established by council directive in 1993. It includes many of the same elements as ISO 14001, but has a different control philosophy. ISO 14001 certification basically tells that the top management of a company has committed itself to environmental excellence and has organized a comprehensive system to fulfil this commitment. EMAS certification additionally tells that the company accepts external scrutiny of its performance,

by submitting to verification of its results by external environmental auditors and by regular reporting of key environmental performance figures to the public. EMAS certification is given for a specific production site, whereas ISO 14001 certification is usually for the more general management system of a company.

3. In OECD (1999) this distinction is between target-based and implementation-based voluntary approaches.
4. The main reason for firms leaving the LTA of their own accord was because there was not enough possibilities for energy-efficiency improvements with the LTA, and they could not see the advantages of the LTA regarding the more easy issuance of the environmental permit.

3 Discussion of the Performance of the Five Agreement Schemes

The comparative characterisation of chapter 2 revealed quite a substantial variation of the five agreement schemes studied in terms of policy background, design features and implementation practice. Obviously, there are several ways to approach the topic of voluntary action, and the questions arise: Which type of characteristics affects the performance of the five agreement schemes? What indicators can be used to describe costs or efforts, and how do the five schemes turn out? Based on a categorisation into three types, in the following section 3.1, we undertake a discussion of the efforts associated with the various types of agreement schemes. In section 3.2, we elaborate on the ability of the schemes to induce supplementary energy savings and emission reductions, and the conclusions are drawn in section 3.3.

3.1 Three Types of Agreement Schemes and Their Implementation Effort

When we in the following talk about implementation effort, this covers the costs related to the administrative tasks, co-ordination, communication etc. incurred by all parties involved in the agreement schemes. Alternatively, one could call these types of costs transaction costs. In this understanding, the implementation effort of the agreement schemes covers both costs for the public administration, here the governmental agency, as well as for the regulated part, which are the firms and in some cases their industrial associations. However, these costs do not cover the abatement costs to the firms, which cover the technical activities (e.g. investments) in the firms to improve their energy efficiency or reduce their CO₂-emissions. Furthermore,

the costs considered in this study are only related to the implementation of the schemes from the moment when it has been decided at the political level to use agreements. This means that costs defrayed before the agreements were initiated are not included.

This means that the implementation efforts are closely related to the particular design and implementation practice of the agreement schemes, e.g. in terms of size, degree of structure and complexity of the interactions, which hinders even a simple comparison of specific cost elements such as administrative costs. At this point a serious problem occurs when the agreement scheme is embedded in a broader policy mix such as in the Dutch and Danish cases. Here, administration costs, which consist for the most part of personnel costs at the agencies in charge, are closely related to accompanying investment subsidies, technical support or tax rebate. This interference of policy measures impedes a proper disentanglement of costs.

Moreover, as the following will show only few estimates of the costs of the agreement schemes exist. Due to missing, incomplete or non-comparable data, it has not been possible to make a detailed quantitative assessment of the implementation costs. For that reason, in the following the discussion is mainly based on *qualitative indicators for the effort in the implementation of agreement schemes*, which are related to the characteristic features of the schemes and the different phases in the implementation process (table 3.1). Cost estimates for the public administration and the industry/firms will be given, when available.

Table 3.1 Examples of indicators for the implementation effort of the agreement schemes

	Governmental Agency	Industrial Associations	Firms
Preparations	Design of frame conditions for the agreement scheme. Gather information about firm conditions. Checking energy audits etc.	Gather information about conditions in member firms.	Energy audits. ¹ Verification. Energy management.
Negotiations	Meetings and contact with firms or associations about the target setting.	Meetings and contact with firms and agency.	Meetings and contact with governmental agency and association.
Administration	Dialogue and guidance of industry. Revision of frame conditions for the agreement scheme.	Co-ordination of target achievement by member firms.	
Monitoring, enforcement and evaluation	Checking data from industry. Sanctioning. Evaluations. Revision of the scheme.	Data collection from member firms.	Data collection. Self-report.

1 Firms sometimes get (some) of their costs to the energy audits reimbursed. In Denmark, firms can get a subsidy to cover some of their costs for audits, whereas firms covered by the Swedish scheme get a full reimbursement of their costs.

From the diversity in the design and implementation practice of agreements, which might reflect the country specific conditions as well as different philosophies, we derive three different types of agreements and implementation effort profiles:

1. **The Danish and Dutch schemes** are rather structured and explicitly integrated in policy mix, and many institutions are involved to fulfil the obligations in the agreements. The target setting and negotiation process are based on sectoral and/or individual energy analyses and audits, and concrete action plans have to be defined for each participating firm. Responsible agencies are in place and able to cope with their obligations in the schemes. In areas where their expertise is limited, technical ex-

perts (consultants) are involved.

The costs in the preparation phase are high for both schemes. In the Danish case, the administrative costs for the firms here amount to 17,000-33,000 Euro in average for each firm, which is considered very high.¹ These costs cover expenses to energy audit and verification, which to a large extent are covered by the firms. In the Dutch case, the costs in the preparation phase consist of a survey of the options for energy conservation for major firms within the industrial associations, carried out by Novem or external consultants. Novem financially supports this. Drawing on the comprehensive preparation stage, the negotiation of targets themselves requires less effort.²

For the last phase, both schemes rely on self-reported monitoring data, which are compiled and handled by the agencies in charge. Due to the direct link of industrial performance and the regulation/tax incentive, monitoring is considered in both cases to be a crucial element, and served as a basis for bilateral renegotiations. The costs for monitoring in the Dutch case are estimated to 50,000 Euro for each participating sector per year. In addition, in the Netherlands and Denmark continuous efforts are undertaken in order to evaluate, to improve and to develop the underlying policy strategies, which add to the implementation costs (see chapter 4). In Denmark the *expected* extraordinary administrative costs for the governmental agencies because of the agreement scheme amount to 4 million Euro per year (Rigsrevisionen, 1998). In the Netherlands *the total costs for the industrial energy conservation policy* between 1989 and 1999 amount to 585 million Euro, where approx. 29 million Euro were spent for Novem staff (Glasbergen et al. 1997). However, the administrative costs for the LTA alone have not been estimated.

2. On the other side, **the French and the German approaches** can be described as non-binding agreements without legally defined tasks, rules or sanction mechanism. They serve as stand-alone approaches, which intend to substitute other climate policy measures. The costs for the first stage of preparation and negotiation can be considered to be rather low, because an explicit preparation and analysis of potentials by the policy side did not take place, and negotiations were based on already available research findings and self-reported information from industry. After

publication of the first version of the German declaration in 1995, however, intensive discussions between industry and government prepared the updated version of 1996. In the French case, the particular negotiations for single branches were facilitated by an already defined »standard voluntary agreement« which sets the principal guidelines and procedures for environmental agreements.

Only few institutions are involved in the implementation process and little or no public administration is responsible for the schemes. Monitoring takes place on the basis of self-reported data and official statistics that are collected and aggregated by the branch associations; and in Germany, this represents the major cost factor for running the scheme.³ Due to the absence of the political alternative, however, none of the two agreement schemes requires an explicit administrative effort to react to the monitoring results in terms of assessing compliance and imposing sanctions at the sectoral or even firm level. Up to now, evaluation studies and attempts for modification of the schemes have not taken place. Summing up, both schemes represent a formal frame for the execution of comprehensive self-responsible activity of industry, and they are characterized by remarkably low implementation costs for the public administration as well as for firms and industrial associations.

3. The **Swedish scheme** represents a particular category on its own. Following a different philosophy by focussing explicitly on pro-active, advanced companies, the coverage of industrial energy consumption is smaller than the other schemes, and the target group is not energy-intensive firms, but environmentally high performing firms. Furthermore, this scheme is much less structured. The programme resulted from a junior civil servant's initiative and was carried out within the already given room and budget for such self-initiated action in the governmental agency. Accordingly, the preparation stage was restricted to the discussion among quite a limited number of agency members, and negotiation efforts were practically non-existent. The programme was offered to the firms as a »take-or-leave-it« choice, and includes governmental support for energy audits and for marketing, whereas all other costs are born by the firms. During the course of implementation, a civil servant was travelling around and covering 30 companies with visits and personal

discussions in each company, but no written reporting took place. Monitoring is based on self-reported progress usually within the ISO 14000/EMAS procedure, but has no further relevance due to a missing sanction mechanism. Overall, the scheme can be considered a rather pre-defined energy management assistance programme, which is run by very few people. Indeed, in the Swedish scheme total costs can be considered to be very low for both parts.

As an intermediate conclusion, a major distinction can be made between the more elaborated, demanding and, thus, more costly approaches in Denmark and the Netherlands, and the German and French schemes, which are characterized by less formalized settings and lower administrative demands, which in turn reduces the implementation efforts. A clear and unequivocal ranking of the »price« for the agreement schemes, however, cannot simply be derived. Nonetheless, the heterogeneous nature and the divergent characteristics and cost profiles depicted represent an interesting starting point for a discussion of the effectiveness of the five policy strategies in the next sections.

3.2 Performance and Effectiveness

The evaluation of effectiveness of the agreement schemes can be undertaken from two perspectives. First it can be questioned whether the targets set by the agreements have been reached (own target achievement). More important, however, it has to be asked whether the agreement induced supplementary effects on energy efficiency and CO₂-reductions in addition to what would have happened anyway. For two reasons, the ability to induce supplementary effects on industrial energy use and CO₂-emissions can be seen as the ultimate benchmark for agreements as for other policy instruments:

- Considering the urgent need for reducing CO₂-emission reductions, any agreement, which only reproduces the trend development, can hardly be accepted by climate policy.
- Distinct effects can only justify any expenditure for the setup and administration of an agreement scheme; without any additional impact

even the lowest budget would be wasted.

For that reason, after the following brief illustration of own target achievement (see 3.2.1) we emphasise a discussion of the supplementary effect of the agreement schemes (see 3.2.2).

3.2.1 Achievement of Own Targets

In the **Netherlands**, the LTAs are targeted to increase the energy efficiency of industry (i.e. reduction of aggregated specific energy consumption) by 20% before year 2000 compared with the 1989 levels. In 1998, the average energy-efficiency improvement in the 29 participating sectors amounted to 17.4% which represented a total energy saving of 117 PJ and 6.6 Mtons of CO₂-emissions a year (EZ 1998a). Extrapolating the observed average annual energy efficiency improvement of 2.1% (1989-1997) to the target year 2000, industry is likely to achieve an overall increase of energy efficiency of 20%. Within industry, however, performance differs and some sectors such as the light industries are behind schedule (11.5% improvement between 1989-1998), whereas base metals and chemical industries (15%) are well in line with the targets (EZ 1999). It has to be noted that the latter sector is of special importance for the aggregated result, because approx. 70% of the total energy consumption in industry and the present target achievement can be attributed to the chemical industry.⁴

In the **Danish** case study findings support the general evidence that both specific investments and special investigations are usually carried out as negotiated. With regard to the implementation of energy-management systems (EMS), however, organizational practice appears to change much slower and less effectively than expected. Firms tend to concentrate on the technical aspects of energy-management obligations whereas the options for pro-active measures for inducing organizational changes are hardly exploited. In Buhl Pedersen et al. (1998) the isolated effect of the agreements is estimated to a 6% reduction in CO₂-emissions in 2005 from the firms signed an agreements. This corresponds to a reduction of the total CO₂-emission in Denmark of 0.4%.

The **Swedish** ECO-Energy programme imposes a set of qualitative targets aiming at acceleration of EMAS and ISO14000 certification. From a formal point of view, the targets have been fulfilled by the participating

firms in a satisfactory manner when they have implemented certain organizational measures, regardless of whether they have actually achieved any improvement in energy efficiency. No estimation of the ECO-Energy's effect on CO₂-emission has been carried out. However, as the energy use of firms involved in ECO-Energy only makes up 1.5% of the total industrial energy consumption, the effect on CO₂-emission is not expected to be significant.

In **France**, the two sectoral agreements studied comprise individual targets for the respective branches. As the available progress reports and data indicate, both sectors perform satisfyingly in decreasing their specific emissions, and in the aluminium case, specific targets (1990-2000: -19% for CO₂, -73% for CF₄) have even been almost fully achieved due to the extensive investment activity between 1990-1996. However, for both sectors severe problems occur in regard to their absolute commitments, because favourable growth of business threatens to boost energy consumption and CO₂ beyond the projected limits.

In the **German** case it has to be distinguished between the various sectoral declarations and the umbrella declaration of German industry which incorporates the quantitative overall goals of 20% reduction of specific energy consumption resp. CO₂-emissions. At the sectoral level, according to the monitoring results it appears to be realistic that most branches will meet their targets, and the degree of target achievement in 1997 was between 60% and 160%. The overall targets for industry, however, cannot be concluded from the sectoral commitments, and the monitoring report replicates this methodological drawback, which impedes a sound assessment of the overall performance. At least, a reduction of absolute CO₂-emissions in the participating sectors of 34.8 million t. CO₂ between 1990 (205.1 million t. CO₂) and 1997 (170.3 million t. CO₂) is indicated, corresponding to a decrease of 17% (RWI 1999, 129). In Germany, too, the chemical industry and the iron and steel industry contributed with almost two thirds (21 million t.) to that result.

It can be concluded, that all five schemes are more or less successful in achieving their own targets, and progress can be stated especially with regard to quantitative improvements in specific energy consumption and emissions. Under these conditions, issues of compliance and free riding are in policy practice of minor importance as long as industry as a whole serves

its overall commitments. However, as already mentioned, the fact of target achievement as such is of no major relevance for policy-making if targets would have been met even without an agreement in place.

3.2.2 **The Ability to Induce a Supplementary Effect at the Firm Level**

This section is devoted to the essential question whether the agreement schemes are able to induce supplementary or extraordinary efforts in the firms compared to what would have been undertaken without the agreements. The importance of this issue is illustrated in the German example where industry explicitly expressed its ambition to undertake »extraordinary« efforts to lower energy consumption and CO₂-emissions. But what does »extraordinary« mean in practice? A proper distinction between trend effects and the additional impact of the agreement would be needed to determine the effectiveness of the instrument. At this point, however, substantial problems arise, as it is difficult to separate the effects of the agreements next to other policy instruments in the energy policy and the performance of industry without the agreement. In order to illustrate options and restrictions to approach this central problem of policy analysis, measures to evaluate the actual impact of the agreement schemes are discussed in the following.

The Business-as-Usual as Point of Reference?

In policy discussions the ultimate benchmark for evaluation is normally seen in the instrument's ability to induce concrete and additional impacts which go beyond the business-as-usual case (BAU). Or more simply: does it make a difference whether the instrument is in place or not? Unfortunately, the notion of BAU itself creates severe methodological and analytical problems and cannot be easily operationalized for policy analysis. A sound empirical basis that allows for a statistical isolation of a single policy instrument is rarely given.⁵

In order to make an attempt to elaborate on the aspects mentioned, three approaches for a quantitative assessment of the actual outcome of voluntary agreements have been investigated within our project, and they were tested with regard to the Dutch LTA.⁶ In box 1 the three approaches and the data from the Dutch case are described. Due to the lack of appropriate data, a

broader international comparison of this type of evaluation of the five countries failed.

Box 1. Three Attempts to a Quantitative Assessment of Agreement Schemes

1. The actual change in energy-efficiency investment behaviour

The actual outcome of the voluntary agreement can be investigated by estimating the additional investment made by industry. A qualitative assessment from the perspective of firm actors and experts has been used in a two-step approach to judge whether and to what extent investments are encouraged by the agreements. In the first step, the overall energy savings (1989-1996) have been attributed to five different energy-conservation categories, and their relative importance was estimated to be as follows: good housekeeping (9%), replacement (32%), retrofit (18%), CHP (22%) and other (20%).

In a second step, the degree of stimulation was estimated for all five categories in five Dutch LTAs, and the result was aggregated to a total degree of stimulation for all five categories together:

- Expert opinion: 31-48% of the energy savings are promoted by the agreements.
- Firm opinion (survey): 29-44% of the energy savings are promoted by the agreements.

All in all it can be summarized that roughly one third to half of the energy-efficiency improvements in the Dutch industry can be attributed to the LTA scheme which corresponds to some 0.6-1.0% energy-efficiency improvement per annum.¹

2. Simulation of the energy-efficiency investment behaviour in the business-as-usual case

This method tries to assess the actual outcome of the agreements by comparing the overall monitored energy-efficiency improvement with model-based estimations of the efficiency improvement in the business-as-usual case. The latter reflects the energy-efficiency improvement due to technological or operational changes in the absence of agreements. The model used was applied in a techno-economic database of energy-efficiency improvement techniques. The various applied models indicate that in 1996 16-47% of the results of all LTAs in the Netherlands (depending on the applied model) can be assigned to the agreements.

3. Monitoring of the historical development of energy efficiency

This method compares the current energy-efficiency improvements with the historical development of energy efficiency as a way to assess the actual outcome of agreements. The historical development of energy efficiency can be determined on the basis of statistical energy consumption data and the physical production of various products. In this approach, the historical development of the energy efficiency is considered as the efficiency improvement in the business-as-usual case. The results for the Dutch paper and board industry, however, are in contrast with other evaluations of the impact of the LTAs. The experiment questions the usefulness of the historical development like the business-as-usual scenario. It can be clearly stated that due to the multitude of parameters and the complexity of interdependencies, past trajectories cannot simply be prolonged into the future without a profound analysis of the techno-economic conditions in the particular sector.

Source: Rietbergen & Blok (1999).

¹ An evaluation of the Danish scheme shows that the implementation of energy management, being only a part of the agreement scheme, results in an improved energy efficiency of 0.5% per year.

For our study, the first approach is of particular importance, because it can avoid some of the disentanglement problems mentioned above. By structuring energy-efficiency measures in typical categories, firm representatives or experts can estimate the relative degree of stimulation by the agreement with respect to the various categories. Inspired by this approach, a qualitative discussion of the impact of the five schemes on energy consumption and CO₂-emissions will be the topic below.

Qualitative Discussion of Impact on Energy Consumption in Firms Induced by the Agreements

In this section, the five schemes will be judged against their ability to induce changes in the areas, which are most relevant for reducing energy consumption and CO₂-emissions in industry. Similar to the first approach in box 1, a set of seven basic options to enhance energy efficiency in industry was defined. With regard to this sample, the empirical findings from our country studies and the sectoral case studies were evaluated by the project team and translated into a qualitative assessment of additional impact of the agreement schemes on the areas described in table 3.2.

Table 3.2 Options to enhance energy efficiency in industry

Options	Requirements	Time frame	Impact of agreement schemes
Change in product design, composition of processed materials and resource use (e.g. thinner and lighter bottles, better recycling etc.).	Strategic commitment and long-term decisions with regard to a change of technical paradigms, process technologies and resource structures.	Long term	Minor effects
Change of energy supply structure (e.g. CHP or renewables).	Strategic commitment and long-term decisions with regard to energy infrastructure and fuel input.	Mid/long term	Some effects, depending on policy mix (e.g. CHP policy in the Netherlands).
Increased technology innovation.	Strategic commitment and long-term investments into R&D.	Long term	Minor effects
Enhanced investment	Change in strategic and operative business goals as well as altered decision criteria and procurement procedures.	Short/mid term	Some effects depending on policy mix (e.g. subsidies) and mandatory requirements (e.g. in Denmark).
Enhanced technology diffusion	Increased communication, exchange of practical experience, dissemination of best practice and generation of new network links, and even energy-related co-operation of competitors.	Mid term	Some effects, depending on existing co-operation and competition
Improved energy management	Integrated approach and systematic search for improvement options, changes in organizational routines, staff empowerment.	Mid term	Some effects depending on design of scheme (e.g. integration of audits in Denmark)
Awareness and motivation	Mobilisation of firm actors, provision of information, know-how and expertise, and continuous discussion of the issue.	Short/mid term	Some effects

The seven options used provide a systematic and comprehensive coverage of possible energy efficiency measures. Among sectors and firms – and therefore among the five schemes – these seven options can differ in importance and potential, because industry represents quite a heterogeneous target group. Nonetheless, when analysing the empirical material with regard to these seven options, interesting patterns of effectiveness can be found among the various agreement schemes, and they show quite a similar impact profile:

1. Especially in basic industries, measures to change material composition, to close resource cycles and to reduce material flows by enhanced recycling or the design of lighter products play a prominent – if not the most important – role to reduce energy consumption and CO₂-emissions of production, e.g. in the cement industry (blending of clinker with blast furnace slack) or container glass industry (thinner and lighter bottles, waste glass recycling). These measures represent very important options to achieve energy efficiency targets, but changes in this field are mainly triggered either by general cost cutting actions or by distinct environmental regulation, e.g. in the field of waste management. Therefore, the energy-related agreements tend to play a minor role as a supporting factor, but hardly induce significant achievements on their own.
2. Changes in the energy supply structure, e.g. by increasing the share of CHP, is another important option to reduce total energy demand for production. Apart from the Dutch case, where a distinct subsidy scheme gave an additional, very important impetus for expanding CHP capacities, the impact of agreements in this regard is rather low. Moreover, the extension of CHP in industry is affected by commitments for action from the utilities, e.g. under separate agreement schemes such as in the Netherlands or Germany, and, thus, cannot be attributed completely to the industrial agreements.
3. In most energy-intensive industries, core processes have been continuously optimized. Significant gains in energy efficiency, therefore, will depend on technological innovation in process technology. Although some R&D activities were initiated by the Danish scheme, the impact of

the agreements appears to be low in general, because for the most part observable R&D activities in place reflect the natural interest and traditionally high engagement of the energy-intensive industries in process improvement. Often, energy-consuming companies belong to international groups which are even among the worldwide leading technology suppliers who develop new process innovations through their own R&D facilities. Under these conditions, the agreements might foster single projects, but hardly change the underlying strategies.

4. In general, agreements tend to have little impact on investment criteria and planning. These decisions are mainly determined by technical life cycles (often 10-15 years or more) or re-structuring effects which take place independently from voluntary action (see the case of the French aluminium agreement). Apart from occasional evidence, a broader shift of investment attitude, e.g. in terms of a relaxation of payback requirements could not be observed if not explicitly required such as in the Danish case. If less demanding profitability requirements are applied to for energy efficiency investments these are mainly backed by already existing exception rules, considering the high R&D content of the measure, marketing reasons etc. However, a positive impact of agreements on the initiation of efficiency investments can be found if energy analyses and management systems are explicitly integrated in the agreement requirements such as in Denmark or Sweden. Especially in cases where less energy-intensive sectors are concerned, investment activities benefit from better knowledge and communication on profitable measures. As a particular feature, in the Dutch and the Swedish cases, energy efficiency guided procurement of equipment is explicitly mentioned, which promises to have a positive impact on future replacement investments.
5. With respect to a faster diffusion of efficiency technologies, the agreements have basically utilized already existing institutional settings, communication channels, networks and personal relations stemming from traditional inter-firm collaboration, e.g. in associations. Within the existing frameworks, the agreements seem to provide new fora for the discussion of environmental and technology issues, and enhanced intra-

branch communication can be seen as one key benefit of the sectoral agreements in France, the Netherlands and Germany.

6. The agreements rarely represent the decisive initial impulse to introduce energy efficient management practice, but often they provide an additional impetus for already ongoing activities. Both the progressing introductions of ISO14000/EMAS as well as existing organizational initiatives for staff qualification serve as a supporting background for the implementation of the agreements, but benefit in turn from the new dynamics and ideas. From our observations, especially in the Dutch, Danish and Swedish case the mandatory focus on strengthening energy management practices in industry represents a major benefit of the agreement schemes.
7. At firm level an influence of the agreements can be observed with regard to awareness rising and increased motivation – and here especially for middle level technical staff. By the firm's commitment, energy efficiency gains importance as a policy issue, but the final penetration of the idea within the whole hierarchy strongly depends on the given individual company culture, which will hardly be affected by the agreement scheme. Within top-management of larger firms and at the level of industrial associations the motivational impact of the agreements is more evident. Familiar with far-reaching political considerations in this target group the agreements and related monitoring procedures serve as a stimulus to reflect on the sectoral contribution to climate policy and the actual mitigation performance.

3.3 **Conclusion on Effectiveness and Efficiency**

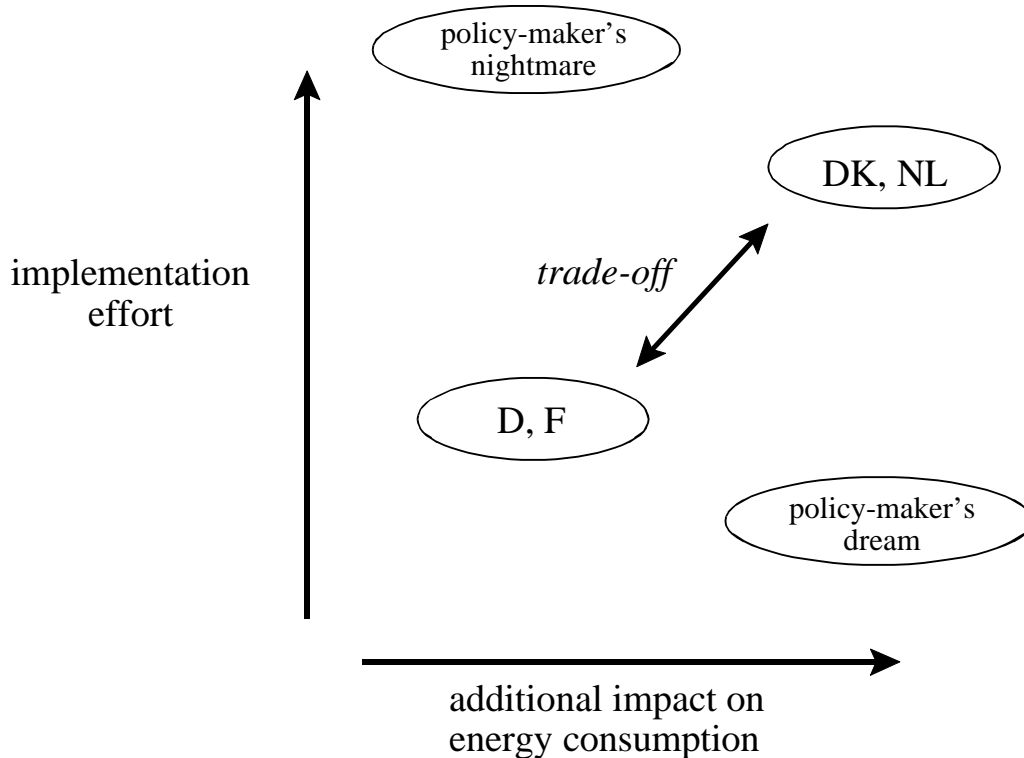
Voluntary agreements are often targeted at energy-intensive sectors such as the basic industries, where changes of material flows, improved energy supply structures and innovations in core process technology represent the most important options to reduce energy consumption and CO₂- emissions. In these areas, however, the agreement schemes like other instruments appear to induce only minor additional effects if not combined with specific

policy instruments for CHP, waste minimisation etc. In this regard, promising options to realize synergies between energy and resource policies evolve. If energy analyses and energy management issues are explicitly addressed by the agreement, a supplementary effect with regard to the knowledge on energy-efficiency options and to the long-term change of operation, maintenance and procurement practices can be expected. In addition, the often-neglected aspect of optimisation of auxiliary equipment might receive more attention than before. In this regard, voluntary agreements appear to contribute to a gradual improvement of the energy-efficiency performance in firms – especially those without elaborated energy management practices like non-energy intensive sectors, small and medium-sized enterprises etc.

Summing up, the effectiveness of voluntary agreements can be seen as strongly dependent on the accompanying policy mix and the supporting framework which has to be adapted to the specific conditions of the target group envisaged. An example is in the Danish case where the agreement is included in a policy mix with a tax.

Relating the empirical findings above to the considerations on characteristics and implementation effort of the five agreements, a clear trade-off between additional impact on energy efficiency and implementation effort can be identified (figure 3.1):

Figure 3.1 Trade-off between implementation effort and additional impact of agreement schemes



Voluntary agreements are sometimes suggested as a cost-effective solution to CO₂-reduction. Whereas energy taxes are obnoxious to industry, subsidies hurt the public budgets, and regulation reduces flexibility, voluntary agreements seem to promise a kind of smart solution. But the case studies give no hint that there would be anything approaching a golden solution. By contrast, additional impacts correlate with high implementation efforts, and the Dutch and Danish agreement schemes which seem to produce results, are quite costly in terms of administrative efforts and provision of an appropriate policy background compared to the much cheaper, but less effective schemes in France and Germany. In this regard, the effectiveness of agreement schemes obviously depends strongly on the ambition and engagement of the political parties, and on their willingness to invest resources and efforts to enforce the underlying policy strategy.

The Swedish scheme is not considered in figure 3.1 because it was designed and targeted as a specific measure for a limited target group, so it cannot be easily compared to the four other broad approaches. Although the programme failed to attract a large share of Swedish industry it served its purpose as a demonstration of feasibility of voluntary programmes, of marketing best practice, of awarding front runners etc. Embedded in a more comprehensive strategy, thus, initiatives of this type might be a very useful and efficient complement serving a niche group.

Finally, it has to be taken into account that the characterisation given in figure 3.1 provides a static view on cost-impact relations, which necessarily ignores dynamic aspects. Efficiency of negotiated agreements must also be linked to the target-setting process. Excluding the Parliament and environmental NGOs from the process may lead to the conclusion of agreements even when they are not efficient. Evidence from a sample of 20 agreements on environmental issues signed in European countries suggests that the process was strongly influenced by motives other than efficiency considerations.⁷

It has to be questioned whether signs for development and improvement can be found which promise an amelioration of environmental effectiveness or reduction of implementation costs. Besides evaluating the effects in the industry, evaluation, modification and policy learning represent additional, crucial aspects of policy evaluation. They will be discussed in chapter 4.

Notes

1. It has to be taken into account, however, that the Danish tax refund scheme has to comply with EU requirements which induce a great deal of the administrative structure.
2. The question is here if the abatement costs for the firms are more than they would have been without the agreements. Does the implementation of the agreement lead to extraordinary costs? The requested payback criterion for investments in the Danish case is up to 4 years, and in the Dutch case, the investments undertaken by firms with an LTA have a payback period of 2-3 years. As these payback criteria correspond to profitable investments, this only indicates few extraordinary abatement costs for the firms.
3. As a rough estimation for the total costs of the German scheme, personnel costs of 1-2 person-months (25,000 Euro) can be attributed to the industrial efforts per sectoral agreement. Taking the total number of 18 agreements, this would sum up to 450,000 Euro, plus

approx. 250,000 Euro covering the expenses for the independent monitoring institution and accompanying research. Together with the fairly low costs for governmental administration the total costs of the German scheme would not exceed 1 million Euro per year.

4. This aspect emphasises the need for a sector-by-sector assessment of national agreement schemes, which cannot be performed within this study.
5. For an outstanding example see the data sample analysed in Bjørner & Togeby (1999).
6. See Rietbergen & Blok (1999)
7. For more details see Chidiak et al. (1999).

4 Evaluation, Modification and Policy Learning in the Five Agreement Schemes

New insights through the implementation experience and changing frame conditions permanently impose the need of a search for better solutions and new opportunities. Thus, climate and energy-policy strategies have to be understood as a continuous search process for designing, revising and modifying policy mix and measures.

Hence, the dynamics of the voluntary agreement processes are of importance to policy analysis, and besides the discussion of strengths and flaws of the five schemes with regard to their current implementation practice, it has to be questioned:

- What are the present activities for evaluating, improving and developing the five agreement schemes in order to increase their effectiveness and efficiency?

Examining the five countries from a dynamic perspective, significant differences between the situation in the five countries evolve.

In the **Netherlands**, the policy background is subject to regular revision, and the third Memorandum on Energy Efficiency (Energy Conservation White Paper) has been adopted (1998). A continuous development of the underlying policy strategy of the LTAs can be found which induces modifications in the scheme as well. Especially due to the unfavourable trend of absolute CO₂-emissions, new opportunities to enforce GHG abatement are searched for. In year 2000 when most of the LTAs expire, new LTAs will be set up which incorporate various changes:

- The ambition of the energy-efficiency target will be increased to an average improvement of 2.2% per annum (compared with 2.0%/year in the old LTAs). Furthermore, certain aspects such as material flows or renewables gain additional importance. Finally, the second generation of

LTAAs will be pursued on a more individual basis.

- For high-energy intensive firms, a new type of agreement has been made available. In the International Benchmark Agreement companies commit themselves to perform as well as the best reference region or sample of plants worldwide.

In **Denmark**, too, the CO₂-tax scheme has been evaluated and revised several times. In this regard, the continuous adaptation and development can be seen as a typical feature of Danish policy-making. In the next version explicit emphasis is put on strengthening the energy-management aspect and R&D activities while relaxing the energy audit requirements. The reason for this is the high costs incurred by the auditing process in the current agreement scheme.

In **France** signs for an extension and development of the CO₂-agreements cannot be found. In industry, commitments have apparently been made with relation to the specific situation in the early 1990s when significant restructuring efforts were undertaken. Whereas pro-active engagement in agreement schemes is missing in the current policy debate, a carbon tax will be introduced in 2001, and a trading system for permits is under consideration, too. At the moment, however, there is no clear indication for the likely direction of the solutions, but in any case, successful agreements in the future would impose new institutional requirements.

For **Germany**, dynamic considerations are of special importance because from the very beginning both the policy and the industrial side considered the DGWP to be a dynamic learning process. Acknowledging the drawbacks of the first version, an updated, partially revised version was published in 1996, and all actors implicitly agreed in the necessity to continue the process of social learning and improvement. Until the summer of 1999, however, only little official evidence of progress and active engagement to improve the scheme can be found. On the political side, the scheme has received little priority after serving its function at the Berlin conference in 1995, and since the end of 1998, the new government has put emphasis on the new eco-tax scheme without specifying the future role of the voluntary agreement therein. At the same time, the weak impact in industry fails to generate sufficient momentum to attract more political, social and economic attention and thereby to provide access to new resources for the develop-

ment and implementation of a more advanced scheme. In this regard, the current policy background can be seen as the major obstacle for revising and improvising the scheme.

Again, in **Sweden** the situation is different because the ECO-Energy programme was terminated in the summer of 1999, after the completion of the case study. The reasons for this policy decision remain to be investigated. The administration of the programme was recently shifted from NUTEK to the National Energy Administration (STEM), and it appears to be subject to another, general reorganization of Swedish energy policy in this field.

Summing up, one can see a continuous effort in Denmark and the Netherlands for evaluating and redesigning the agreement schemes. No such effort can be seen in the Swedish, French and German cases.

5 Transferability of Concepts and Practices in the Agreement Schemes

Voluntary approaches represent a fairly new instrument in energy and climate policy, so that experience made in some countries, which are more advanced, is of special interest to others. Especially the Dutch LTAs and different public voluntary programmes in the USA, e.g. the Green Lights Programme, often inspire other countries to adapt comparable measures. In this regard, a growing exchange on voluntary agreements is already taking place, and the advantage of such a transferability of national experience is seen in the benefiting from already undertaken trial-and-error. Hence, a crucial question to be addressed in this chapter is: Is it possible to transfer national experience with agreements across countries or to the European level?

The last chapters have shown that the agreement schemes considered show a variety of measures, structure and actors. They are strongly dependent on the peculiar policy background, the history as well as manifold characteristic details, and to a certain extent every approach can be seen as a unique original. For that reason, any one-to-one replication is very likely to fail, but nonetheless, some general conclusions concerning cross-national comparisons and learning can be derived. In this regard, the question arises whether the five agreement schemes studied represent national specialities or whether they can make a useful contribution in an international setting.

First of all, from the country studies we derive some general pre-conditions and basic requirement for effective agreement schemes. They are given in chapter 6 and they can be seen as the prerequisites for any kind of engagement in the field of voluntary agreements.

In addition to these generally valid prerequisites, we will in the following present some essential aspects, which serve as guiding questions to assess

the compatibility of the national agreements in question with other country-specific settings. This set of questions might serve as the starting point for further evaluations of transferability, but they point as well at clear limitations of transferability of the agreement schemes considered across countries and to the EU level.

5.1 **Guidelines for Cross-National Transferability**

It has to be carefully examined if the instrument in question actually fits into the national, political, economic and social context. Voluntary agreements can represent a complex policy process. In many cases, particular socio-economic conditions impose decisive barriers for a successful adoption of foreign concepts, and thus, impede a cross-national transfer of policy instruments.

1. The Political Frame

1.1. Does the tradition of communication and negotiations between industry and government allow for a co-operative approach?

A culture of co-operation and a common societal consensus about the need for CO₂-reduction are decisive pre-conditions for the working of the agreement schemes. This includes a consensus between different ministries (environment, economic affairs etc.) in a country, because a common position of all governmental actors can foster an ambitious target setting and the implementation of agreements. When these basic conditions are not given, the crucial stage of target setting is likely to be dominated by internal struggle, opposition and confrontation which hinder the formulation of ambitious, but nonetheless commonly accepted targets.

1.2. Do appropriate agencies exist, which are capable of administering the agreement schemes?

As a second pre-condition, the introduction of effective agreements requires responsible agencies with clear roles, rights and responsibilities. If these institutional requirements cannot be provided, e.g. due to scarcity of public funds, regulatory tradition or conflicting competencies of administration, a successful transfer of agreement schemes such as the Dutch or Danish

approach is rather unlikely.

1.3. Are the industrial actors sufficiently organized in order to fulfil collective commitments?

Corresponding to the public agencies, the empirical analysis emphasises that branch associations have an important role to play in agreements, too. In most cases, especially sectoral commitments, they are deeply involved with the negotiations and target setting for their member firms; and afterwards, they are often intended a role in the implementation and reporting of the firms' progress. Hence, branch associations must have a clear role towards their member firms and the necessary organizational prerequisites for fulfilling their obligations in the agreements. Without sufficient legitimisation, competence, capacities and engagement of the associations, a sectoral approach is likely to fail.

2. The Role of Agreements in a Policy Mix

2.1. Does a policy mix support the agreement?

The empirical analyses gave the clear message that the agreements demand integration in an existing comprehensive policy mix or the provision of newly created, appropriate complements. Therefore, severe problems and barriers to the transfer of effective voluntary agreements might occur in countries that lack a tradition of executing industrial energy-policy instruments.

2.2. Is the role of the agreement scheme in the policy mix sufficiently specified?

A subsequent question is what role the agreements are intended to play in the particular country's energy policy. Should the agreements be the main instrument towards the industry's energy use or should they focus on selected target areas or groups? A general answer cannot be given, because the target group as well as the purpose of the schemes differ. If the purpose of the agreement scheme is a high industrial coverage, a Swedish-like scheme will not do. However, if the intended purpose of the scheme is to reward front runners, a transfer of the Swedish scheme is suitable.

Moreover, an evaluation of the Danish scheme actually indicates that voluntary agreements are the most costly part of the Danish policy mix, so

that from a stand-alone perspective they appear rather unattractive. However, in the context of Danish energy policy they make sense because they are directed at specific productions, where other national policy instruments fail. Any assessment and transfer of national experience therefore has to investigate carefully the particular strategy in place.

The composition of the policy mix, i.e. the measures needed to affect the firms' behaviour, depends on the type of firm and industries in the target group. It makes a difference whether firms are acting on a national or global market, if they are imposed to competition, and if they have already successfully increased their energy efficiency before they sign an agreement. Moreover, agreements with branches demand a high share of responsibility and solidarity among sector firm members, which is less likely in highly competition-ridden sectors and markets. The measures needed for firms operating in the national market need other measures than firms operating on the global market. In many sectors firms are owned by foreign trusts. These international players clearly follow different strategies than the domestic actors, and management rules are rather determined by the headquarters than by national policies. The measures needed for front runners in the energy area are different than for backward firms. So an effective agreement scheme should be adapted to the target group in question in order to include the necessary measures to cope with these differences between firms. A simple transfer of approaches between countries even among the same sectors risks ignoring characteristic features of the national industrial structure.

5.2 **Transferability of National Schemes to the EU Level**

The national experience studied for this report indicates that much of the success of voluntary agreements depends on parameters that are not easily reproducible at the European level. As the general requirement, emphasis is put on the organization of the negotiation process and the setting of ambitious targets. Having the particular problem of organizing political and industrial interest groups at the European level in mind, this evaluation calls for caution and a careful study of national experience before making deci-

sions to proceed at a European level.

As a starting point for the following discussion, focus can be achieved by strict use of the subsidiarity principle, i.e. asking where the member states most clearly fail, and where the European Community has the biggest chance of doing something that member states cannot. Further suggestions for agreements at the EU level will be made.

5.2.1 Possibilities for EU Action

According to the principle of subsidiarity, voluntary agreements should be implemented at the European level only if that would have a significant advantage over national action. In principle, action at the European level promises to be more consistent with the development of the single market and to allow higher demands on energy efficiency without negative effect on competitiveness and employment in Europe. The limitations on member states' capacity for action are particularly evident in the following fields:

1. National governments are reluctant to impose taxes or strict regulations, because this might easily tip the competitive balance in favour of companies in member states with less active policies, i.e. create a kind of self-discrimination in the single market. Credible threats of energy taxation are difficult to table in negotiations with the energy-intensive branches of industry, as they are known by both parties to have unwanted effects on the single market, i.e. to hurt the competitive position of national industry, create unemployment, etc.
2. National subsidies are a way out of this self-discrimination problem, but it is difficult to define the line where they start to be discriminatory against companies in other member states, i.e. work against the single market and be in conflict with European Community Law (e.g. the Danish agreement scheme needed approval by the Commission because of the tax reimbursement). In contrast to national subsidies, European subsidies would secure a level playing field.
3. The transnational structure of large companies may tend to make national action ineffective, as companies may move production internally, i.e. shop for subsidies and tax advantages with little effect on aggregate CO₂-

emissions. Furthermore, the empirical evidence shows that in some cases multinational firms need their head office to approve investment decisions, which complicates the implementation of the voluntary agreement. This could be overcome by having agreements at the EU level instead of national schemes.

So European authorities may have some strength that could be exploited within an agreement scheme:

- The option to provide subsidies at the same conditions for all industry within the single market.
- Their supervisory role in relation to national subsidies.
- Regulations concerning the single market.
- Allowing the setup of more EU wide branch networks for exchange of information and experience.
- Helping less experienced member states catch up.
- Providing for deeper administrative competence and use of more advanced methods such as benchmarking, as the number of similar companies and productions would be greater than at the national level.

In principle two options for EU activities exist:

Joint action is essential in **collective approaches**, such as the Dutch and German agreement schemes (and for some of the French agreements). Companies within a branch must be willing to work together to find solutions and distribute obligations among themselves. This depends on strong branch associations or on an industrial structure setup for oligopolistic behaviour, i.e. dominance by a few large companies. Of course encouragement by the government is important for the actual use of such structural potentials, but the structures need to be in place for the model to work. The crucial problem is that associations with ability to discipline their members are not common at the European level.

If agreements should be settled with **individual firms**, the Swedish type of focus on the specific segment of front runners would in some ways seem well adapted to emulation at the European level. The low administrative costs would be a major advantage. The lack of dependence on associations would be valuable. The scheme fits fairly well with instruments that are available to the European Community, such as subsidies, certification and

labelling, and competition regulation (for instance rules for public procurement). It does not depend on instruments that are presently unavailable or less available to the community, such as energy taxes or the ability to exert politico-administrative pressure on companies. Within such a scheme promotion of market transformation could also be relevant, as market transformation is less relevant in a national context. Also mechanisms to promote benchmarking (being part of the new Dutch agreement scheme) could also be a possible element of a European scheme. This would require a uniform target setting and monitoring of energy consumption in order to compare results and effects (Rietbergen & Blok, 1999). It has to be taken into account, however, that such agreements are limited to a small fraction of European industry, and other, more comprehensive strategies are needed to address the large majority of industrial energy consumers.

5.2.2 **Limits of EU Action**

Even though a European action has some advantages, there are clear limitations on the transferability of national agreement schemes to the EU level, and not all requirements depicted above and in chapter 6 are easily fulfilled at the European level. Among these the following aspects are of special concern.

The Administration of Individual Commitments

The explicit commitment of the individual firm, even under a collective agreement, appears to be an essential pre-condition for effectiveness. In this regard, it is difficult to see agreements with larger groups of individual firms transferred to the European level as negotiations, monitoring and enforcement require a close relationship between the governmental agency and the respective firm. This would impose high administrative costs on the European authorities, which can hardly be handled by European institutions. For example, a simple scaling up of the Danish scheme to the European level would require a responsible agency with a staff of 600-1000 people, involved in great details with negotiating and supervising the specific investment activities and energy management systems of ten or twenty thousand production units. Looking at the crucial role of Novem, a reproduction of the Dutch scheme would be no less demanding in an administrative sense.

Therefore, the best chance for reproducing a collective model is in branches at the European level that are dominated by few large companies, as the task of negotiating and supervising voluntary agreements may become manageable. An administrative capacity of the same absolute size as in the Netherlands or Denmark might be sufficient, if the number of companies were brought down to the same level as in these countries.

It follows that any suggestion of reproduction of experience with voluntary agreements at the European level needs to take a hard look at the resource situation at this level, administratively as well as economically. Does a responsible agency exist at the European level that is able to handle the complexities of an effective voluntary agreement scheme? Could it be built? Should it be built?

5.2.3 **The Need for Substantial Offers and Demands**

Those national schemes that are most substantial in their offers and demands, are also those that have come closest to establishing a working sanction system – and those which promise to have the greatest additional impact on industrial energy efficiency. It would certainly seem wise for European authorities to adopt the Danish and Dutch experience in this regard, i.e. to make certain that sanctions are available, and that they are used, too, at least occasionally. But obviously, in voluntary agreements this needs to be accepted by the private side. Its willingness to submit to an agreement with sanctions is likely to depend strongly on the substance of the benefits offered by the public side. It is probably no coincidence that the strongest sanctions are accepted in Denmark, which also provides the most substantial economic benefits.

The types of sanctions, which can be imposed, depend a great deal on the benefits offered to participating companies. In Denmark, this connection is quite straightforward, as the benefit is a tax rebate, and the sanction is an annulment of this rebate. In the Netherlands, the relation is more complex, as the major benefit offered is a collective one. The sanctions cannot be a simple negation of this collective benefit. Instead, non-performing companies can be transferred to a regulatory regime involving their environmental permit.

Thus, the national experience provides no clear model of sanction mechanisms that are reproducible at the European level. It only indicates the

importance of developing such mechanisms.

5.2.4 **Voluntary Agreements at the EU Level?**

A combination of European and national action, taking into account the strengths and weaknesses of each level may indeed be the most promising road to more effective voluntary agreements. *The most effective European agreement scheme may be one that stimulates national action, removes hindrances, and provides some co-ordination.* Action exclusively at the European level should probably be confined to highly focussed actions, directed at branches that are particularly amenable to European action. It should be carefully prepared through the development of a strong bargaining position on the public side, never based on vague political threats, but always on the ability to offer tangible and substantial benefits to the private side. It would need to include targets that are either carefully worked out to be self-controlling, or are embedded in a credible system for monitoring and sanctions.

It has to be taken into account, however, that in the case of substantial benefits such as tax breaks, any kind of distinction and segregation of participants is likely to induce problems regarding the discrimination of the rest of European industry or concerning the compatibility with national legislation, which has to care about the non-participating part of the sectors.

Such practical considerations would seem to indicate that the combination of national and European level actions has more potential for success than the pursuit of purely European approaches. Most of the advantages of European level action could be exploited also by combined actions, whereas the strength of national action could simultaneously be preserved. In this regard, the principle role of European action can be seen in defining the general framework and the mandatory requirements for actions at the national level.

6 Conclusions and Policy Recommendations

6.1 Lessons on Strengths and Flaws of the Five Agreement Schemes

The major lesson from the empirical analyses is: voluntary agreements can have an impact on industrial energy consumption and CO₂-emissions if they are embedded in a broader policy mix, which is adapted to the specific target groups, and

- sets guidelines and ambitious targets for decision-making at firm level, e.g. with regard to process improvements, investment planning or recycling quotas
- provides support and incentives to perform energy conservation actions, and
- explicitly enhances energy-efficient management practices.

This policy mix, however, depends on the ambition of the underlying policy strategy and the quality of target setting, which, therefore, represent the principal factors of success or failure. Accordingly, special emphasis has to be put on the stage of preparation and negotiation, i.e. the exploration of efficiency potentials, of structural changes and the limits of feasibility.

Considering the paramount importance of the policy intentions and framework and the target setting, practical aspects of administration and monitoring do not represent a condition for effectiveness as such. If the agreement scheme incorporates a weak, unambitious target, the achievement of this obligation requires little additional effort for all actors. If there is no burden to share, and as long as the formal commitments are met, compliance and free riding are of no importance. Accordingly, in these cases the quality of the monitoring system is of minor relevance to the

enforcement of targets, and there is no need for sophisticated administration. By contrast, within a challenging target framework, administration and monitoring gain relevance because both individual and sectoral commitments have to be enforced, and complying front runners among firms and sectors needs to be awarded and non-complying laggards to be sanctioned.

By shifting attention from implementation aspects to the preceding stage of policy-making, negotiation and target setting, the following remarks have to be made:

- The importance of the negotiation stage points at the political role of voluntary agreements. For example, in relation to ambitious target setting new questions arise of how to share the national burden among the various end-user groups and between the different sectors (what is an appropriate target for industry?). Such a debate requires broader participation, e.g. concerning Parliament and environmental interest groups.¹ Up to now, however, the latter are practically excluded, and agreement schemes are negotiated by the political administration and industrial lobbyists without further public participation. Only in the Danish case, burden-sharing between the service sector and industry was part of the debate on the CO₂-package in Parliament. In Denmark, also the burden-sharing between households, transports and business has been discussed – also with consumer organizations and environmental NGOs.
- The inter-relation between the policy process and the voluntary agreement's performance is twofold. On the one side, as indicated, the ambition of target setting determines the outcome. On the other side, the agreements in turn can serve as a tool for a policy search and learning process. Due to the analyses undertaken during the preparation stage of the agreement, to the implementation experience and the monitoring results, agreements can generate new insights and information concerning the possibilities and limits for energy-efficiency action in industry. In all case studies, positive effects of agreements on the policy-industry communication could be observed. However, learning needs to be operationalized by explicit action concerning the rules for evaluation, revision and adaptation, and sufficient capacities to perform the related tasks of analysis, assessment and preparation of proposals for modification.

With regard to the transferability of national experience all five schemes represent unique solutions in a specific policy context which cannot easily be replicated. However, they can serve as fruitful inputs for the policy debate in other countries, if the policy background, the prevailing regulation practice and the intentions with what to reach by voluntary action are carefully compared. Furthermore, any consideration of transfer should take the abilities and political chances to enter a satisfactory negotiation process for target definition into account. Finally, comparable resources and administrative capacities have to be provided. Starting from these premises, foreign experience can then serve as material for the development of an individual solution, which in any case should consider the requirements depicted in the following section.

As a summary conclusion it can be stated:

Voluntary agreements can play a useful, facilitating role if integrated in a climate policy mix. However, this requires proper preparation and negotiation of demanding targets as well as a combination with substantial incentives for compliance by other policy instruments. Moreover, regular monitoring and evaluation have to be explicitly utilized for policy learning. By this, effective agreement schemes impose significant institutional demands, i.e. implementation costs. Moreover, a sound preparation of voluntary agreements takes time, so that they are not necessarily a suitable means for accelerating the climate policy process.

6.2 **Policy Recommendations for the Future Role of Voluntary Agreements in Energy and Climate Policy**

In order to benefit from the potential of voluntary agreements as supplement, facilitating elements of energy policy, the lessons learned should be taken into account when agreement schemes are designed and put into effect. The above conclusions support the normative demands concerning the organizational prerequisites and contents of agreement schemes as discussed by Hansen et al. (forthcoming).² In the following, these demands will be extended and put into a broader context of energy and climate

policy-making by formulating nine policy recommendations. They will be structured by four groups.

- Policy context and target setting (I-III)
- Criteria, rules and procedures (IV&V)
- Administration and agencies (VI-VIII)
- Involvement of the single firm (IX)

I. Voluntary agreements have to be embedded in a broader policy discussion

Within the framework of international and national climate policy commitments, voluntary agreements represent an option to facilitate the process of national burden sharing if the negotiation process is subject to a general policy debate among all sectors, target groups and stakeholders. This can help to create a common position of government, e.g. by reconciling divergent interests of environmental and economic ministries. In the same respect, the development, performance and the future role of the agreements as for all other instruments should be part of permanent evaluation and discussion in order to detect critical flaws and to identify new opportunities for action.

II. Profound analyses and preparation are needed for ambitious target setting

Considering the demanding challenges of climate protection and the evolution of sustainable energy systems, significant abatement efforts are required that exceed normal technology progress and investment activities. In this regard, better knowledge is needed to specify feasible but ambitious targets, which represent a satisfactory advance compared to the reference case. As a precondition for effective target setting, therefore, profound analyses and a careful quantitative preparation of negotiations are needed.

III. Target definitions have to cover the relevant driving forces for industrial energy consumption and GHG emissions

As depicted in chapter 3, energy consumption and CO₂-emissions in industry are influenced by a wide range of determinants which include changes in material flows and energy supply infrastructures. Especially in energy-intensive basic industries, where the scope for pure energy conservation

measures in the traditional sense is limited, significant reductions in energy consumption are mostly due to shifts of processes rather than improving processes. Therefore, in cases of agreements based on aggregated efficiency or reduction targets, all relevant determinants of industrial energy use should be covered. Hence, an integrated assessment which accounts for all energy and resource inputs should be undertaken for a comprehensive target definition, including

- industrial CHP,
- feedstocks (non-energetic use of fossils³), and
- new resource inputs, e.g. by recycling or renewables.

It has to be taken into account, that at the current stage substantial methodological problems still have to be solved before reduction potentials can be identified and targets can be set (e.g. accounting for substitution of fossils by secondary fuels such as waste).

In the case of climate policy agreements, it is recommended to adapt target definitions to the Kyoto protocol, and all six GHGs should be included, if these are relevant for the sector specific technologies (e.g. in the case of the chemical or aluminium industry). Furthermore, besides reducing CO₂-emissions, energy efficiency contributes to mitigate other energy-related environmental impacts such as SO₂ or NO_x. Therefore, links between energy related and climate policy agreements and other instruments of environmental policy should be taken into account in order to benefit from synergies, especially in terms of generic environmental management or integrated pollution prevention (such as in the French and Swedish agreements).

In addition to improvements in production, the amelioration of the energetic performance of products at the end-user side gains increasing political importance as a field of voluntary action. Without questioning the need for increasing energy efficiency of investment and consumer goods, however, product-related targets and measures have to be treated strictly independently from process improvements in order to avoid a weakening of targets and commitments, e.g. in terms of double counting between suppliers and users of equipment.

IV. Criteria, rules and procedures have to be carefully prepared and negotiated before implementing an agreement scheme

In addition to the quantitative target setting, emphasis has to be put on a sound preparation and an ex-ante determination of rules, criteria and procedures for the implementation of the agreement schemes. Once in place, formal deficiencies such as vague and misunderstandable wording, low target levels, neglect of important drivers for energy use, methodological drawbacks when defining energy consumption, systematic double counting etc. represent the nucleus of permanent conflict and struggle. Under these conditions, the proper execution of the schemes is hindered and risks to fail the initially intended goals. In this context, especially the monitoring of performance and verification of compliance – and thus of success – are important. Under ambitious target setting, incentives evolve for the single firm to avoid the efforts and costs of realising the additional efficiency measures, which are not part of the firm's normal investment planning. For that reason, the definition of monitoring and verification procedures with regard to the individual and/or sectoral performance is directly related to the definition of targets. It should be the objective of the preparation stage to settle already critical and conflicting positions in order to enhance a smooth implementation of the scheme. Two aspects are relevant:

1. A specification of appropriate criteria and indicators for the assessment of achievements is required. Efforts have to be made to link target definitions and performance to publicly available, transparent data such as official statistics, tax registration, authority approval of investments etc. in order to mitigate problems resulting from the dependency on self-reported monitoring data. Furthermore, calculation methods and data for internal correction factors have to be made transparent.
2. Procedures and rules have to be fixed, which determine the execution of monitoring and further use of information. It has to be clearly fixed and commonly accepted which kind of political reaction correlates to what kind of monitoring result.

V. Frames and rules have to be set to enable policy learning

The principal political challenge has to be seen in addressing critical aspects

and potential risks, drawbacks and loopholes already in the beginning when negotiating the frame and design of the agreement schemes. Due to the fact, that policy making will always have to deal with sub-optimal solutions, emphasis should be put on designing an appropriate framework for an »alert mechanism« for an early identification and reaction to critical developments or tactical delays of action. In addition, this prepares the ground for continuous search and improvement processes. The intention of policy learning has to be operationalized by an explicit and binding schedule of evaluation and the ex-ante determination of how to use the monitoring results for assessing, revising and modifying the policy strategy.

VI. Agreements should be implemented and administered as part of a policy mix

The industrial energy system is characterized by complex interdependencies of technologies, processes, material flows, structural effects as well as (international) political and economic boundary conditions which often cannot be easily changed. Therefore, differentiated policy strategies are needed to provide incentives as well as support both in a long-term and short-term perspective. Voluntary agreements can complement these strategies, but agreements should not be introduced as stand-alone approaches. Emphasis has to be put on exploring the trade-offs and synergies with other measures in order to create convincing demands and substantial offers for the negotiation process, so that agreements should refer to already existing or simultaneously introduced policy. In this context, the introduction, improvement and extension of energy management systems, e.g. in line with EMAS/ISO14000 certification, represent an essential element in the policy mix.

VII. Institutional capacities have to be provided for implementing voluntary agreements within policy

For an effective implementation and administration of an agreement within policy strategies, executive bodies have to exist in order to perform a double task. First, they should be equipped with sufficient capacities and funds to execute the agreement schemes which require capacities

- to analyse potentials and new options,
- to develop rules and procedures and to assess action plans, progress

- reports and monitoring results, and
- to execute sanctions.

At the same time, the second task is related to build up the technical and managerial competence needed

- to provide practical support and financial incentives,
- to overcome barriers to the rational use of energy in industry by information campaigns etc., and
- to co-operate with industry in innovation projects etc.

The latter tasks are typically aligned to national or regional energy agencies, which represent important drivers for energy-efficiency enhancement. In general, appropriate structures have to be found in order to minimise the collision of roles, functions and responsibilities between the arenas of energy, climate and tax policy. At the same time, however, synergy losses due to inefficient collaboration between different agencies in charge must be avoided.

VIII. Agreement schemes have to be differentiated by target groups

In order to create the dense network of information exchanges, public-private interactions and supportive measures needed for introducing effective agreements, the specific conditions and specialities of the target group have to be taken into account. For that reason, collective commitments should be targeted to rather homogeneous groups within a reasonable size. General schemes covering huge and diversified sectors are unlikely to establish effective impact mechanisms for all participants. Due to the risk of insufficient internal co-ordination in these cases, appropriate sub-groups have to be split-up to reduce technical complexity and to focus on the administrative efforts.

IX. Firms have to undertake individual commitments, and individual target setting should be part of a collective scheme

Considering the dimension of reductions needed to fight climate change, every firm within the industrial target group should contribute to the common challenge according to its specific possibilities, and the agreement schemes might serve as a forum for the specification of individual commit-

ments. In this context, flexibility of voluntary agreements has to be understood as the opportunity to explore the most appropriate way to contribute to the overall targets, but not as the freedom to do nothing. In general, therefore, it should be the objective of policy making to prevent all kinds of free riding⁴ concerning

- passive member companies of industrial associations,
- non-member firms from the sector not covered by the branch association, or
- whole sectors without sectoral commitments.

For that reason, individual goals and action plans have to be elaborated regardless of whether a bilateral scheme or a sectoral approach is in place. It has to be noted, however, that individual target setting imposes institutional requirements for the assessment and approval of action plans, which can create significant transaction costs. An unsolved trade-off exists between the efforts for the administration of firm specific commitments on the one side, and the inefficiency of general, equally valid reduction rates on the other side.

Final Remarks on General Lessons for Flexible Instruments

The above-mentioned lessons describe the conditions for the design and administration of voluntary agreements. In principle, these conclusions can be transferred to the area of flexible instruments under the Kyoto protocol. Comparable to voluntary agreements, emissions trading and the Clean Development Mechanism cannot replace political target setting, but depend on the explicit definition of caps and rules.

Notes

1. This aspect is supported by the theoretical analysis of Chidiak et al. (1999), which points at significant welfare implications related to public involvement.
2. They draw on the demands and organizational prerequisites defined in European Commission (1996).
3. Here, particularly the share of non-energy use is of importance, which is oxidized immediately during the production process. Most important are feedstocks in the steam-cracking

process and the total amount of hydrocarbons used for ammonia production (cf. Patel, 1999).

4. However, in industries with a few dominating firms and many small firms, a voluntary agreement might well be good policy – seen from the public side as well as from the dominating companies – even if there are a lot of free riders among the small companies. It may not be so important quantitatively what happens in the small companies, and the dominating companies may not be too worried about unfair advantages for free riders, as long as there are no major competitors among these.

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