

Design of an evaluation framework for evaluating voluntary agreements on industrial energy efficiency

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Abstract

Literature on voluntary agreements on industrial energy efficiency was reviewed with the objective to find an appropriate method to analyse this policy instrument. Both evaluation methods based on a theoretical framework were looked for, as well as success factors for voluntary agreements that can serve as evaluation criteria.

Five studies evaluating voluntary agreements on industrial energy efficiency were found that applied a comprehensive theoretical framework as a basis for the evaluation method. Most of methods evaluate the process of a voluntary agreement by analysing the interaction between actors. These methods are in some cases complemented with methods analysing the impact of a voluntary agreement scheme. The analysis of the success factors resulted in a list of eleven factors, of which three are key: ambitious and challenging targets, motivation to enter into an agreement from both business and the government, and incentives for participation and/or penalties for non-compliance.

Based on these results, a comprehensive framework to evaluate policy instruments was designed, defined as the Actor-Interaction-Mapping method. It consists of four steps: 1) distinguish various phases in the implementation of the policy instrument; 2) list all relevant, involved actors; 3) determine all relevant interactions between the different actors during the lifetime of the policy instrument; and 4) determine the intended impact of these interactions and compare it with the actual impact.

The practical application of this method was illustrated on voluntary agreements on industrial energy efficiency. It results result in an exhaustive list of evaluation questions that is compiled in a structured way.

Introduction

Many states all over the world rely on voluntary or long-term agreements to encourage energy efficiency in industry. Such agreements are defined as formal agreements - essentially contracts between governments and industry - that include negotiated targets with time schedules and commitments for all involved parties (IEA 1997).

The oldest voluntary agreement on energy efficiency is the Canadian Industry Program for Energy Conservation, established in 1975 (Tiedemann and Sulyma, 2011). Since then, voluntary agreements have been implemented across the world. In Europe, they were one of the most rapidly growing policy instruments since 1992, when the Fifth Environmental Action Programme of the EU presented voluntary agreements as one of the alternatives to market-based instruments (Krarup and Ramesohl, 2002; van Beeck, 2007).

In the second National Energy Efficiency Action Plans (NEEAPs) (DG ENER, 2011), 16 out of the 27 EU Member States reported to have at least one voluntary agreement on energy efficiency in industry in place. In the third NEAAPs (DG ENER, 2014), the number of EU Member States with operational voluntary agreements has declined to 7; however 5 new Member States were planning or testing this policy instrument. This information was cross-checked with the MURE database (ODYSSEE-MURE, 2015) on energy efficiency policies and measures in the European Union and other relevant documents.

Based on this information, an overview was made European countries that have implemented voluntary agreements on energy efficiency in industry, see Figure 1. Some countries already have a tradition of several decades in using voluntary agreements to stimulate energy efficiency in industry,

- *An empirical focus*: what are the key success factors for voluntary agreements? These key success factors can then be used as evaluation criteria.

Both approaches were then integrated into a new comprehensive framework for evaluating voluntary agreements on energy efficiency.

Applied frameworks to evaluate voluntary agreements on industrial energy efficiency

Of the nineteen reviewed studies, only five could be found applying an evaluation method that was based on a comprehensive theoretical framework. The other evaluation studies had a narrower scope and focussed on a limited number of evaluation criteria.

Johannsen (2002) based her analysis of the Danish agreement scheme on energy efficiency in industry on the *implementation analysis*. Applying this analysis method, she regarded agreements as a process with different phases: the practical preparations, the negotiations leading to the agreements, its implementation and the monitoring of the scheme. In each of these phases, different actors have different roles and the actions and interactions between these determine the success of the agreements. Johannsen (2002) used this method to analyse the policy-making process and the design of the scheme. In addition to this method, Johannsen (2002) used five criteria to evaluate the implementation and the results of Danish agreement scheme, see **Table 1**.

Table 1: Criteria applied by Johannsen (2002) to evaluate the Danish agreement scheme

Criteria	Evaluation aspects
Static concerns	<ul style="list-style-type: none"> • Is the scheme designed to catch the cheapest savings first? • Is the cost reasonable, compared with the savings? • Are there provisions for the prevention of free riding?
Dynamic concerns	<ul style="list-style-type: none"> • Does the policy instrument stimulate the development and diffusion of new energy-efficient technology? • Is the policy instrument flexible over time?
Institutional demands	<ul style="list-style-type: none"> • What are the competences, credibility and organisational capacities that are necessary for the implementation of the scheme?
Political dimensions	<ul style="list-style-type: none"> • What are the distributional implications of the policy instrument? • Is the policy instrument perceived as ethical and fair?
Risk	<ul style="list-style-type: none"> • What is the outcome risk, i.e. the risk that the chosen policy instrument may not lead to the expected pollution abatement? • What is the risk of negative side effects from the intervention, e.g. a technology standard creating barriers for innovation?

Johannsen was well aware that she evaluated the Danish scheme from the regulator's perspective applying this method; it does not analyse the potential to give industry more responsibility and a more pro-active role in environmental policy-making. But this was deemed as an appropriate choice for the Danish scheme.

Dinica et al. (2007) used an actor-oriented framework based on the heuristic of *Structure-Conduct-Performance* to evaluate the second generation of the Dutch Long Term Agreements. This framework looks at the following two aspects to understand the performance (output) of the voluntary agreement scheme:

- The features of the implementation structure, understood as the set of rules, resources and actors that organise the actions and interaction processes
- The conduct of actors during the implementation process, that is how actors behave and interact with each other in the implementation processes

Both aspects may be influenced in various degrees by three categories of variables:

- Policy-related factors, such as policy design features or experiences with enforcement
- Contextual factors from other policies that may overlap creating synergies or incompatibilities
- Other contextual factors, such as economic, social or political

Finally, four aspects of performance were differentiated using this Structure-Conduct-Performance framework:

- The likelihood of implementation
- The extent of implementation
- The timing of implementation
- The adequacy of implementation

Dinica et al. (2007) focussed on the extent (the practical implementation of the Energy Saving Plans, of the energy efficiency measures and of the Energy Management System) and the timing of the implementation (the timing of the Energy Saving Plans' approval) when analysing the second generation of the Dutch Long Term Agreements.

In the EMEEES project harmonised evaluation methods were designed to evaluate the measures implemented to achieve the 9% energy savings target set out in the EU Directive on energy end-use efficiency and energy services (2006/32/EC). A method was also developed to analyse voluntary agreements (Loozen et al., 2009).

The calculation method starts with the energy use, defined as the energy purchased by the individual participant in the voluntary agreement; it is for that reason called the *billing analysis method*. The billing analysis method is a very quantitative oriented approach. It results in an estimation of the total annual energy savings of the voluntary agreement, taking factors such as double counting, multiplier energy savings, the free-rider effect and the energy savings lifetime into account.

Rezessy and Bertoldi (2011) reviewed the experiences of voluntary agreements in the field of energy efficiency and emission reduction, implemented in the European Union. Their method to compare the different schemes was a *practical framework*. It looked at:

- The target sectors and actors
- The obligations and commitments
- The motivation to join and the mechanisms for discouraging non-compliance
- The reporting provisions, monitoring and evaluation
- The results delivered

Applying this framework to the European voluntary agreements, conclusions could be drawn on their key characteristics, success factors and barriers (see below).

Stenqvist and Nilsson (2012) took inspiration from the process-oriented approach of *Theory-Based Evaluation* when evaluating the Swedish voluntary agreement PFE. This Theory-Based Evaluation approach examines how programme activities are expected to bring about the desired changes. This approach not only aims at examining if the targeted impacts are achieved, but also why or why not. An important focus in the application of this approach is the estimation of the additionality as the observed impact can also arise from other policy instruments or contextual factors. It applies to this end a system analytical procedure by separating the programme under research in its components, by examining these, and by communicating the interpretations. Applying this Theory-Based Evaluation approach, Stenqvist and Nilsson (2012) examined the 'process' of the Swedish voluntary agreement PFE, which was an assessment of: the eligibility and programme coverage; the goals and achievement.

Stenqvist and Nilsson (2012) evaluated also the impact of the PFE programme; they applied to this end the billing analysis method, that was developed in the EMEEES project. The researchers determined more precisely the gross and net impact; the impact of the energy management system, the legally binding nature of the Swedish agreement, the electricity price development, the free-rider and multiplier effect, the double counting effect; and the cost-effectiveness of the scheme

Key success factors reported in literature

In the empirical focus of the study, the literature on voluntary agreements on industrial energy efficiency was reviewed to find key factors for a successful implementation for such agreements. These key success factors can then serve as criteria for an analytical procedure to assess such agreements.

Both evaluations of one single voluntary agreement and assessments of several voluntary agreements are reviewed; in total eighteen studies on voluntary agreements were analysed. **Table 2** lists these studies, specifies which voluntary agreements were examined and indicates which success factors or barriers were observed.

The review of the literature on voluntary agreements has resulted in the identification of eleven success factors. However, some success factors are reported in more of the reviewed papers than others.

Three out of these eleven success factors are mentioned the most and seemed to be key (numbers in brackets indicate the number of studies mentioning this success factor):

- The motivation of both industry and the government to enter into an agreement (9)
- Ambitious energy saving targets (10)
- Incentives for participation and penalties for non-compliance (12)

The following eight success factors are cited to a lesser extent by the reviewed studies:

- The extent in which the voluntary agreement is embedded the other policy mixes (5)
- Flexibility in implementing the agreement (5)
- Commitments to individual participants rather than to the participants as a group (4)
- Powerful, competent authorities (4)
- Stringent monitoring and verification procedures (6)
- The implementation of energy management schemes (4)
- Involvement of third parties (5)
 - Either an involvement of third parties, such as consultants, supporting the individual participants in fulfilling their obligations under the agreements
 - To a lesser extent, the involvement of third parties (NGOs for instance) controlling the execution of the voluntary agreement on behalf of society
- Knowledge sharing, information exchange amongst the individual participants, eventually supported by the administrator and/or third parties (consultants, technology providers) (5)

Conclusion of the literature research – Design of a comprehensive evaluation framework

The theoretical focus of the literature review only revealed five papers that based their analysis method on a theoretical framework. None of these five, but one³, seems to use the same framework or even to refer to each other's framework. As a conclusion, there is no common, generally accepted framework to evaluate voluntary agreements on energy efficiency in industry.

The basis of both the implementation analysis, applied by Johannsen (2002), and the actor-oriented framework, applied by Dinica et al. (2007), is the analysis of the interactions between actors. However, they differ in approach: Johannsen (2002) distinguished different phases in the complete course of the voluntary agreement, for which she mapped the different actors and their interactions. Dinica et al. (2007) differentiated among several aspects of performance to analyse the

³ Stenqvist and Nilsson (2012) applying the billing calculation method developed in EMEEES

Table 2: Overview of the studies assessing success factors and barriers of voluntary agreement schemes

Study	Voluntary agreement studied	Observed key success factors	Observed barriers
Jochem and Eichhammer (1997)	Unilateral declarations of the German Association of Industry and Commerce	<ul style="list-style-type: none"> • Qualitative and flexible targets; this requires a constantly update of the knowledge on profitable potentials in industry to set adequate and moving targets and design suitable measures • Information and training campaigns to assist the participants in detecting the untapped energy efficiency potential • The involvement of independent experts for monitoring of the results • A good dialogue between the federal government and the industrial associations 	
Chidiak (2002)	French voluntary agreements with two energy-intensive sectors (aluminium and packaging glass)		<ul style="list-style-type: none"> • Lack of co-ordination between and even internal conflicts within governmental bodies • Modest objectives • No clear threat of alternative measures of a GHG policy
Johannsen (2002)	Danish voluntary agreements	<ul style="list-style-type: none"> • Obligations at firm level • Close monitoring • Sanctions in cases of non-compliance 	<ul style="list-style-type: none"> • energy audits not an effective tool to reveal the first best energy saving solution • high search and administrative costs • Insufficient negotiation on the design between the government and industry • Too strong incentives
Helby (2002) Lindén and Carlsson-Kanyama (2002)	Swedish EKO-Energi programme		<ul style="list-style-type: none"> • Vague, general formulated goals • lack of a time schedule for the programme • lack of instructions on monitoring
Krarup and Ramesohl (2002)	French, Danish and Swedish programme	<ul style="list-style-type: none"> • Voluntary agreements being embedded in broader policy mixes, which are adapted to the specific target groups, • Guidelines and ambitious targets for decision-making at the firm level, e.g. with regard to process improvements, investment planning or recycling 	<ul style="list-style-type: none"> • Lack of ambition of the underlying policy strategy

Study	Voluntary agreement studied	Observed key success factors	Observed barriers
		<ul style="list-style-type: none"> quota • Support and incentives to implement energy conservation measures • Energy-efficient management practices • ambition of the underlying policy strategy 	
Hanks (2002)		<ul style="list-style-type: none"> • Quantified ambitious and attainable targets • Commitments to the individual companies • The enforcement of sanctions • The inclusion of requirements for monitoring, reporting and verification of results • The participation of external experts 	
Dalkmann et al. (2005)	Various voluntary approaches in the European Union	<p>Advantages:</p> <ul style="list-style-type: none"> • High flexibility in the implementation of voluntary agreements • Fostering the dissemination of information between participating firms • The opportunity to create environmental consciousness within firms • Collection by the government of information about the environmental problem, about abatement strategies and about costs evolving for industry • The involvement of third parties, such as NGOs, Parliaments, local communities or research institutes 	<p>Risks</p> <ul style="list-style-type: none"> • Weak targets in the event that the industry have influenced the outcome of voluntary agreement in its own interest (regulatory capture)
Price (2005)	Various voluntary approaches in Asia, Oceania, Europe and North-America	<ul style="list-style-type: none"> • Threat to or actual implementation of regulations or taxes, in combination of additional incentives or penalties 	<ul style="list-style-type: none"> • Completely voluntary nature of the agreement which leads to less government pressure for participation
Khan (2006)	Finnish audit programme	<ul style="list-style-type: none"> • Flexible and step-by-step planning approach • Changes kept to a minimum • Interlinkages of policy instruments • Clear vision on central elements of the policy instrument: training, monitoring, quality control, 	

Study	Voluntary agreement studied	Observed key success factors	Observed barriers
		<ul style="list-style-type: none"> tools and subsidies for auditing • Co-operation and dialogue with stakeholders • Long-term political support • Active promotion of the policy instrument • Training of auditors • Systematic and thorough monitoring • Flexible and competent implementing agency, which was given considerable freedom 	
Modig (2006)	Industrial Energy Efficiency Network in Norway	<ul style="list-style-type: none"> • The high number of certified energy efficiency consultants • Coverage of most of the cost to participate • The management of the programme by a new dedicated organisation • Close contact between this organisation, the governmental bodies and the participants 	
Ericsson et al. (2006)	(Revised) Danish voluntary agreements	<ul style="list-style-type: none"> • Incentive: high CO₂ tax rebate • alignment of mandatory energy management scheme with environmental and quality management schemes • Open dialogue between the Danish Energy Agency, as administrator of the agreements, and the companies and their associations 	<ul style="list-style-type: none"> • In some sectors: weak and inactive branch organisations and the unwillingness of individual companies to co-operate and share information with other companies
Ekins and Etheridge (2006)	UK Climate Change Agreements	<ul style="list-style-type: none"> • Incentives 	<ul style="list-style-type: none"> • Low targets
Dinica et al. (2007)	Dutch Long-Term Agreements	<ul style="list-style-type: none"> • The exchange of information among companies and support from sector platform • Firm policies in which these agreements are embedded 	<ul style="list-style-type: none"> • Unambitious targets
Glachant (2007)	Theoretical exercise	<ul style="list-style-type: none"> • Strong lobbying, leading to not be too strict but yet challenging enough obligations to motivate high enough compliance incentives • Low risk for the regulator in the event of non-compliance 	

Study	Voluntary agreement studied	Observed key success factors	Observed barriers
Gels H. (2009)	Guidance on how to set up voluntary agreements	<ul style="list-style-type: none"> • Good communication • Simple administration • Motivating targets • Efficient monitoring and reporting • Support to participants • Combining to existing activities • Personal enthusiasm 	<ul style="list-style-type: none"> • Uncertainty in government policies • Uncertainties in target-setting and cost-effectiveness • Missing knowledge and tools • Limited resources in administration • Limited resources in participating enterprises • Confidentiality risks • Heavy reporting
Rezessy and Bertoldi (2011)	Voluntary agreements reported by 13 EU Member States	<ul style="list-style-type: none"> • A culture and trust and cooperation between the national authorities and the targeted sectors • A proper institutional framework with following five core elements: <ol style="list-style-type: none"> 1. Ambitious but realistic targets (quantified commitments) set by legislation or national policy beyond business-as-usual, covering a major part of the industrial sector 2. A public authority with appropriate energy statutory powers and expertise 3. An effective and independent monitoring and evaluation mechanism 4. Credible and enforceable mechanisms to discourage non-compliance 5. Accompanying measures in order to facilitate the implementation and success of agreements 	
Stenvist and Nilsson, 2013	Swedish voluntary agreement PFE	<ul style="list-style-type: none"> • Obligation to implement an energy management scheme • Incentives: a tax rebate • A dedicated PFE legislation making the PFE programme legally binding 	

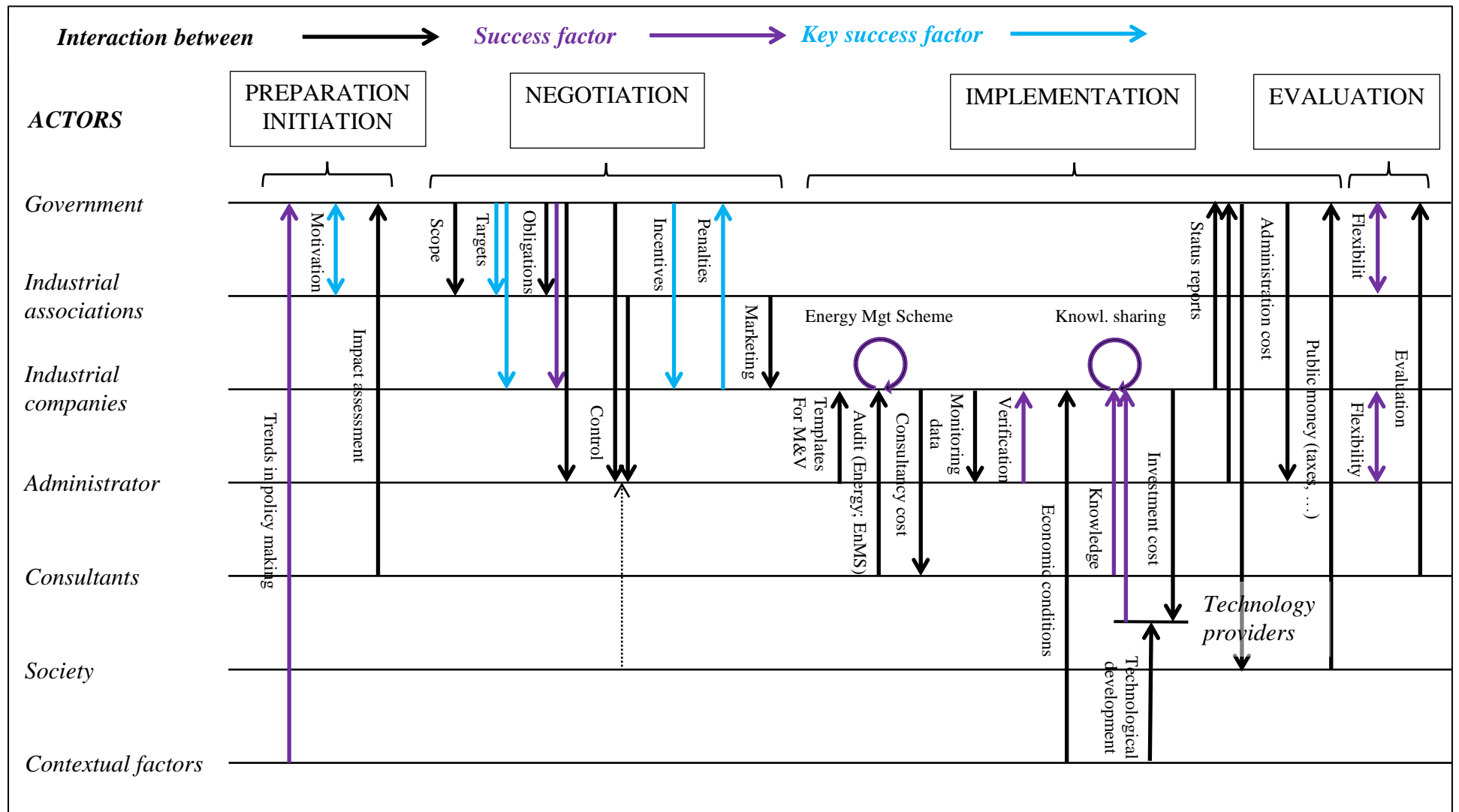


Figure 2: Actor-Interaction-Mapping method applied to voluntary agreements on energy efficiency

role of the policy design as compared to contextual factors, emergent implementation structure features, and actor conduct on the policy performances. The process-oriented approach of Theory-Based Evaluation, applied by Stenqvist and Nilsson to analyse the Swedish PFE programme, broke the programme down in different activities, but was less specific in differentiating actors impacted by the programme activities.

The application of these three frameworks allows to better understanding the functioning of a voluntary agreement, but it is a rather qualitative analysis and it does not lead to conclusions on the results of the agreement. It hence needs to be complemented with a quantitative analysis of the impacts of a voluntary agreement. Johannsen (2002) applied five additional evaluation criteria, while Stenqvist and Nilsson (2012) evaluated the impacts using the EMEEES billing analysis method.

Rezessy and Bertoldi (2011) based their analysis on a list of design features of the voluntary agreement schemes. This approach allowed to compare the various voluntary agreement schemes in the EU, but failed in explaining the relation between the results and the design.

The empirical focus of the literature review has resulted in the identification of eleven success factors, of which three seemed to be key. All these factors touch an aspect of the functioning of a voluntary agreement. Hence, this list of success factors can be with the methods analysing the interaction between actors.

Based on these conclusions, a comprehensive evaluation framework for voluntary agreements on energy efficiency in industry is designed, defined as the *Actor-Interaction-Mapping method*. Inspired by Johannsen (2002), it takes the identification of the different phases of the agreement and the identification of the various actors as the first two steps. Inspired by Dinica et al. (2007), it add the contextual factors as an actor. It then indicates the interactions between the various actors as a next step. These interactions are a combination of the features of the implementation structure, inspired from Dinica et al. (2007) and the list of success factors derived from the literature review. As the last steps, the intended impact of these interactions is determined and, inspired by Stenqvist and Nilsson (2012), compared with the actual impact.

Illustration of the comprehensive evaluation framework on voluntary agreements on energy efficiency

The procedure of the Actor-Interaction-Mapping method is now illustrated on voluntary agreements on energy efficiency. **Figure 2** schematically presents this method.

1. Distinguish various phases in the implementation of the policy instrument.

Applying this to voluntary agreements on energy efficiency in industry and inspired by Gels (2009), following phases are defined:

- a. The preparation and initiation phase: scanning the possibilities of establishing a long-term agreement scheme in the national framework and including the preliminary negotiations
- b. The negotiation phase: concentrating on the preparation of the agreement
- c. The implementation phase: the operational lifespan of the agreement
- d. The evaluation phase: both including a mid-term evaluation in order to fine-tune the running voluntary agreement and a final evaluation, evaluating the continuation of this policy instrument

These phases are indicated on the top of **Figure 2**.

2. List all relevant actors that are involved both in the various phases of the policy instrument.

Applying this to voluntary agreements on energy efficiency in industry, a distinction is made between:

- a. Government, aiming to reduce the energy consumption and/or related greenhouse gas (GHG) emissions in industry
- b. The industrial companies, who have to take actions to realise the objectives of government

- c. The sector organisations, defending the interests of industry and entering in negotiation with government on this policy instrument, that should realise the government's objective
- d. An administrator that is appointed by government to implement the voluntary agreement in close relationship with the individual industrial companies
- e. Third parties, supporting the industrial companies in fulfilling their obligations under the voluntary agreement; they can either be consultants carrying out energy audits for the industrial companies, technology providers presenting feasible energy saving measures to the industry, or auditors verifying whether an energy management scheme is implemented well
- f. The society (or part of it) who has to carry the financial burden associated with the policy instrument; this can be the tax payers or the energy end consumers, depending on what is taken as a basis to collect the necessary funds
- g. Contextual factors, other than the actors listed above but which have an influence on the way the policy instrument is implemented. Examples are: climate concerns that stimulate governments to reduce GHG emissions in all sectors or fuel prices that have an impact on the economic feasibility of energy saving measures in industry.

These actors are indicated on the left side of **Figure 2**. Horizontal lines are added for indicating the interactions between the actors.

3. **Determine all relevant interactions between the different actors during the lifetime of the policy instrument.** The interactions between the actors are the leads for the research questions of the evaluation study. These interactions should lead both to aspects related to the functioning of a voluntary agreement as well as to its results. **Figure 2** indicates these as arrows. The three key success factors, derived from the literature research, are highlighted in blue while the other success factors are highlighted in purple. Other structural features of a voluntary agreement are added as well in all identified phases; they are a mix of reports (such as an ex-ante impact assessment or status reports), information (such as marketing or knowledge sharing), rules (such as obligations towards all participants of a voluntary agreement) and financial resources (such as cost for consultancy or the administration cost).
4. **Finally, determine the intended impact of these interactions and compare it with the actual impact.** The list of research question of the evaluation study is composed in this final step. This list should be as exhaustive as possible, covering both process aspects and the impacts of the evaluated voluntary agreement. It should also include both qualitative and quantitative assessments.

Table 3 gives examples of evaluation questions to determine the intended and actual impact of some interactions, depicted in **Figure 2**.

The application of this Actor-Interaction-Mapping method results in an exhaustive list of evaluation questions that is compiled in a structured way, which is the purpose of this method. The map of the interactions between the actors presents an overview of the evaluation study and can be used to depict its scope.

This comprehensive framework will now be used in studies evaluating voluntary agreements in order to test its workability. In addition, the framework will also be used in studies evaluating other policy instruments. Although developed to evaluate voluntary agreements, the design of the Actor-Interaction-Mapping method is not specific for voluntary agreements but has the potential to be generic enough to be widely used to evaluate a broader range of policy instruments. Future research studies will hence test this hypothesis on the range of applicability of Actor-Interaction-Mapping method.

Table 3: Evaluation questions on the intended and actual impact of some interactions

Interaction	Between	Intended impact	Actual impact
Motivation to enter into an agreement	Government – Industrial associations	<ul style="list-style-type: none"> To what extent is there a culture of trust between both parties? What are the interests of both parties to enter into an agreement? 	<ul style="list-style-type: none"> To what extent did the motivation to maintain this agreement change along its lifetime?
Scope	Government – Industrial associations	<ul style="list-style-type: none"> Which industrial sectors are eligible to enter into this agreement? From what size are industrial companies eligible to enter into this agreements? What is the rationale of this selection? What is the size of the target group? 	<ul style="list-style-type: none"> Which share of the target group did participate to this agreement? How much industrial energy consumption was / GHG emissions were covered by the participants? How did the level of participation evolve along the lifetime of the agreement and why?
Reporting	Industrial companies – Administrator	<ul style="list-style-type: none"> What do the participants to the agreement have to report on and at what intervals? 	<ul style="list-style-type: none"> To what extent were the reporting obligations respected by the participants? What were the causes of the eventual deviation from the intended schedule?
Evaluation	Consultants – Government	<ul style="list-style-type: none"> Is an evaluation of the agreement embedded in its design, and if so, what are its requirements? 	<ul style="list-style-type: none"> Did an evaluation take place? What was its scope? Who was involved in its execution? What were the results and conclusions? To whom were these disseminated? To what extent did the recommendation influence the design of the existing or a new agreement?

Conclusion

Literature on voluntary agreements on industrial energy efficiency was reviewed with the objective to find an appropriate method to analyse this policy instrument. On the one hand, evaluation methods based on a theoretical framework were looked for. Five such studies were found. Most of methods evaluate the process of a voluntary agreement by analysing the interaction between actors. These methods are in some cases complemented with methods analysing the impact of a voluntary agreement scheme. No common, generally accepted framework to evaluate voluntary agreements on energy efficiency in industry seemed to be in use. On the other hand, success factors

for voluntary agreements were looked for as well, as these can serve as evaluation criteria. The review of eighteen evaluation studies resulted in eleven success factors of which three are key.

Based on these results, a comprehensive framework to evaluate policy instruments was designed, defined as the Actor-Interaction-Mapping method. It consists of four steps:

1. Distinguish various phases in the implementation of the policy instrument
2. List all relevant actors that are involved both in the various phases of the policy instrument
3. Determine all relevant interactions between the different actors during the lifetime of the policy instrument
4. Determine the intended impact of these interactions and compare it with the actual impact

This approach was illustrated for voluntary agreements on industrial energy efficiency. The application of this Actor-Interaction-Mapping method can result in an exhaustive list of evaluation questions that is compiled in a structured way. This comprehensive framework will now be tested in next studies.

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