Evaluation of different policy instruments to promote industrial energy efficiency in a national context

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Abstract

To promote energy efficiency in industry, a variety of policies have been successfully implemented in the European Union. Besides the EU-ETS with its direct and indirect impacts on industrial energy efficiency, other instruments such as energy saving funds, energy efficiency obligations (EEOs), fiscal and financial instruments, subsidies as well as regulative instruments and information policies are currently implemented and used. The intensity and the mix of these instruments, however, differ significantly between the EU Member States. The actual proposal for a new Energy Efficiency Directive suggests saving obligations as preferred instrument to promote energy efficiency among all sectors. In any case the Directive will lead to further implementation of such policies. Their actual impact, however, depends highly on the national framework. We systematically show the strengths and weaknesses of the main policy instruments which are actually implemented or discussed in order to promote energy efficiency in industry. With a multi-criteria, semi-quantitative approach considering eight main criteria we evaluate the costs and benefits of these instruments, taking the example of Germany. Among these criteria are costs, addressable energy saving potentials, market conformity, price and rebound effects and (re)financing. The quantitative evaluation shows that none of these instruments on their own can exploit all efficiency potentials in industry determined here in full, but that a mix of instruments is necessary. The calculations also show that a further development of the currently implemented instruments in Germany addressing energy efficiency in industry is in principle sufficient in order to tap the existing saving potentials. This requires, however, considerable efforts with regard to a further development of regulation, compliance control, budget-funded financial incentives and the wider spread of energy management systems. This option, however, is especially limited by the restricted availability of public funds. Therefore, the possibility of a budget-independence of the funding in particular supports a supplementary deployment of new instruments such as an EEO as part of the future mix of policy instruments addressing energy efficiency in industry.

Introduction

The EU Directive on energy end-use efficiency and energy services (Directive 2006/32/EC; ESD) names both energy efficiency obligation (EEO) schemes (frequently also known as "white certificates" or "energy saving quota") and an energy-saving fund as potential new instruments for achieving energy savings in the Member States. To date the United Kingdom, Italy, France, Denmark and the region of Flanders have introduced energy efficiency obligation schemes and an introduction is planned in Poland. However, the existing schemes appear in very different forms. Furthermore, energy-saving funds have been long established in the United Kingdom and Denmark. The already ongoing discussion on energy efficiency schemes was stimulated by EU Commission's proposal for a new Energy-Efficiency Directive (EED) of June 2011 (European Commission 2011). In Article 6 of the EED, the introduction of energy efficiency obligation schemes is proposed for all Member States. According to the proposal, final energy suppliers or the distribution network operators would be obliged to annual energy savings of 1.5 % of the previous year's energy sales by volume (without transport). Article 6 further allows a certain degree of flexibility when designing the scheme. In addition, Paragraph 9 gives Member States the option to meet the target using other instruments and measures as an alternative to the savings quota.

In Germany the instrument of energy efficiency obligations was included in the Federal Government's Energy Concept of September 28, 2010 (BMWi 2010) in the form of announcing a "white certificates" pilot project in conjunction with associations within the energy industry. The Energy Concept also sets out further ambitious energy saving objectives. By 2020 primary energy consumption and the energy demand for heating in buildings are to be reduced by 20 % and electricity consumption by 10 % compared to 2008. Given that, achieving the national saving objectives set in the Energy Concept will require additional political measures and thus a growing funding framework, the saving quota instrument is increasingly being discussed in Germany from the perspective of being able to provide budget-independent funding of energy-saving measures. Further, an "Energy and Climate Fund" was set up as a consequence of the Energy Concept (BMF 2010), which among other things is used to finance an energy-efficiency fund that supports efficiency measures for consumer, SMEs and industry as well as local authorities. At the moment, this fund is mainly financed from the revenues generated by the emissions trading scheme. This way of financing is, however, is rather volatile due to its strong dependence on the respective price for CO_2 certificates. The current low prices have already led to a cut of the financial means for the energy and climate fund for the year 2012 (BMF 2012), which further stimulated the search for a stable and budget-independent financing of energy efficiency measures in Germany.

The energy efficiency policy in Germany both with regard to the building sector and to industry was dominated by regulations and financial and fiscal incentives, which were accompanied by some information and education programs (Schlomann et al. 2009). The previous discussion at national and at EU level on the introduction of relatively new instruments of energy efficiency policy as e.g. energy efficiency obligations or energy-efficiency funds has shown that there are still many open questions in respect of the effect (cost/benefit) of a potential introduction of these instruments. This is valid for the macroeconomic perspective as well as for the perspective of the affected actors. Another question that is of particular importance for Germany is how existing instruments and measures as well as those proposed by the Energy Concept can be effectively combined with potential new instruments.

Within this context, we performed a cost-benefit analysis on the introduction of an energy efficiency obligation scheme (with and without certificate trading) and of an energy-efficiency fund in Germany. Further analysis is made concerning how the expansion and improvement of the existing set of energy-efficiency policy instruments is to be evaluated compared to the new instruments. In this paper, the focus is on policy instruments to promote energy efficiency in industry. The same approach, however, is also applicable to other sectors of final energy consumption.[1]

1. The results presented here are based on a study on the costs and benefits of of the introduction of market-oriented instruments for realizing final energy savings in Germany (Schlomann et al. 2012). In the study, apart from industry the building sector and electrical household appliances were included in the analysis, too, only the transport sector was left out.

Methodological approach

The methodological approach we chose for this analysis is based on three pillars:

- A thorough design of the energy efficiency policy instruments taken into account, which were an energy efficiency obligation scheme (with and without trading), an energy-efficiency fund and, as a third option, the expansion and improvement of the existing set of instruments. The chosen design option for these instruments is intended to serve as the basis for the comparative analysis of the instruments.
- The calculation of energy-saving potentials and their costs, using a bottom-up model for the industrial sector which was developed by Fraunhofer ISI and which is regularly used for the determination of energy saving potentials in industry in Germany and at the European level (see e.g. Fleiter et al. 2011). These calculations both served as the basis for the setting of the energy saving target which should be achieved by the instruments and for the quantitative evaluation of the suitability of the instruments to meet the defined targets and of the costs of the instruments.
- A qualitative analysis of additional criteria for the comparative evaluation of the instrument options, which could not be assessed at a quantitative level (as e.g. impacts on the competitiveness, on the market for energy services, distribution effects, interaction with existing instruments, or the refinancability).

DESIGN PROPOSAL FOR THE EVALUATED INSTRUMENTS

Below a design proposal is presented for each of the following policy instruments compared:

- energy efficiency obligation scheme (also taken into account the possibility of certificate trading)
- energy-efficiency fund and, as a further option,
- expansion and improvement of the existing set of instruments.

The proposal acknowledges the central design features for each instrument and is based on a comprehensive evaluation of the pros and cons of potential design options. With regard to the possible design of an energy efficiency obligation scheme and of an energy efficiency fund, in particular, experience of already existing systems in other Member States of the European Union was taken into account.[2] The resulting recommendations are made exclusively with respect to the following comparative analysis, i.e. for purely analytical reasons. However, these recommendations shall not prejudice the design of the scheme from the perspective of the contracting entity or the experts.

2. For a comprehensive overview of already existing energy efficiency obligation schemes and their comparison see e.g. Staniaszek & Lees 2012, Lees 2012, Bertoldi et al. 2010, Bertoldi/Rezessy 2009 and the presentations of several workshops that have taken place since 2011 on this instrument: a workshop organized by the Joint Research Center (JRC) on January 27/28 2011 in Varese (http://re.jrc.ec.europa.eu/energyefficiency/events/WhC_Workshop.htm), a joint workshop of the European Commission and the European Council for an Energy Efficient Economy (eceee) on September 30 2011 in Brussels (http://www.eceee.org/eceee_events/energy-efficiency-obligations) and a further workshop organized by several partners (including IEA, RAP, DG Energy) on January 18/19 2012 in Brussels (http://www.iea.org/work/workshopdetail.asp?WS_ID=549).

Table 1 summarizes the fundamental elements of the recommended design for an **energy efficiency obligation scheme** (with certificate trading) that forms the basis of the following cost-benefit analysis. A broad scope with few restrictions in terms of fuel sources subject to quotas, sectors and types of measure is recommended. This offers the potentially obligated companies broad variety of cost-effective energy-saving measures to adopt. To avoid double accounting, however, it is recommended that efficiency measures in processes that are directly subject to ETS are excluded. Transport is also removed in the first instance,[3] but should be integrated into the scheme in a later phase. The choice of the baseline is of particular importance. Only energy savings that exceed the standard defined by the baseline are legitimate for the generation of saving titles. If a non-ambitious standard had been used as a basis (i.e. the average of current stock), many savings would be accounted for under the obligation but represent a pure deadweight effect. Measures that had been taken anyway would then be entitled to initiate the issuance of certificates. Thus, the market average is generally recommended as the baseline, since it is usually known or predefined by a standard (as e.g. Ecodesign).

To guarantee direct comparability of the instruments for the following analysis, the design of the other instruments investigated is conducted in the same way as the energy efficiency obligation scheme; i.e. the same sectoral restriction and the same degree of ambition is assumed. The **energy-efficiency fund** is conceived as an institutionalized fund that possesses an administrative organizational structure.[4] As opposed to that, the energy-efficiency fund established in the wake of the Federal Government's Energy Concept is managed by the Federal Ministry of Economics and Technology. The funding provided for this to date is under €100m for 2011 and 2012 and an increase to a maximum of €300m by 2015 (BMF 2012) is considerably less than the institutionalized funds in the UK and Denmark and also clearly below what was assumed in existing proposals for the creation of an energy-efficiency fund in Germany.[5] The current energy-efficiency fund should therefore rather be considered as additional funding in the scope of an expansion of the existing range of instruments.

Table 2 summarizes the key elements of the design proposal for an institutionalized energy-efficiency fund. It represents the basis for the following cost-benefit analysis of the instrument and the comparison with an energy efficiency obligation scheme.

The option of an **"expansion and improvement of existing instruments"** was examined as a further instrument besides the energy efficiency obligation scheme and an institutionalized energy-efficiency fund. However, this does not include a detailed analysis of the effectiveness of all existing instruments of the energy-efficiency policy and it does not include the development of improvement proposals. Instead, merely a comprehensive comparison is made of the way in which these instruments work as compared to an energy efficiency obligation scheme or an institutionalized energy-efficiency fund. Only instruments whose savings effect goes beyond the baseline are taken into account. The instrument option is designed as a mix of improved and tighter regulations (incl. improvement of compliance), expansion of financing in the form of low-interest loans, direct grants or tax incentives as well as additional advisory programs (audits, efficiency networks). It is evaluated using the same criteria as for the other instrument options examined, namely energy efficiency obligation scheme and energy-efficiency fund.

CALCULATING THE ENERGY-SAVING POTENTIALS USING A BOTTOM-UP MODELLING APPROACH

The energy-saving potentials were calculated using the bottom-up model of the Fraunhofer ISI for the industry (see e.g. Fleiter et al. 2011). This model is fundamentally set up to be dynamic, i.e. it takes into account cost reductions through technological progress and broader market penetration through efficiency technologies. The framework data for the development of energy-relevant activity factors and the energy prices used for the calculations correspond to those from the energy scenarios for the Federal Government‘s Energy Concept (Prognos et al. 2010). The potentials were all calculated based on a reference development (baseline) that is in line with the (ambitious) requirements as were also made on the design of the instruments (see Table 1 and Table 2). That is to say, only such potentials that exceed a specific standard such as Ecodesign as prescribed by the baseline are considered. This means that a saving potential which is calculated against such an ambitious baseline is considerably smaller than a potential which is e.g. calculated against a frozen efficiency scenario.

Table 3 summarizes the calculated energy-saving potential in industry for 2020. The potential is both presented as the average annual saving up to 2020 and also as the cumulative annual saving that can be achieved in 2020. In terms of designing an energy efficiency obligation scheme for Germany, it was recommended that processes that fall under the EU Emissions Trading Directive should not be included in the scheme's scope of validity. However, as these processes are not excluded from the draft of the new EU Energy-Efficiency Directive, they are set out as a variant in Table 3. The energy saving potential calculated in the industrial sector both includes the impact of energy savings measures addressing industrial cross-cutting technologies which are used in all industrial branches and process technologies only used in specific industrial sectors (as e.g. chemical, steel, cement, ceramic, aluminium or paper industry). Several energy saving options are considered in the industrial model which can be characterized as follows (the first two options are both relevant for cross-cutting and process technologies, the latter only for process technologies):

- Use of best available technology (BAT)
- Optimised operation
- Process innovations
- Waste heat recovery

Apart from the saving impact of an energy saving option, the model also takes into account the investment costs of the saving

3.The proposal for a energy efficiency obligation scheme in the draft for a new EU Energy-Efficiency Directive (Article 6) also excludes transport in its setting of targets (although measures in the transport sector can be accounted for in the fulfillment of targets), but EU-ETS is not excluded there.

4. Comparable with the funds in Denmark (www.savingtrust.dk) and the UK (www.energysavingtrust.org.uk).

5. See e.g. Öko-Institut et al. 2009 and Irrek & Thomas 2006; that assumes a required annual funding volume of around €1-1.5 billion.

Table 1: Design proposal for an energy efficiency obligation scheme (with trading).

Design elements	Design proposal
Reference of the savings target	Reference final energy, saved final energy quantities weighted with primary-energy factors.
Differentiation of the saving target	No explicit differentiation of the saving target by fuel source (consequently no differentiation in the energy-saving certificates); however, weighting should be done by applying primary energy factors (see above).
Fuel sources subject to quotas	No specification required from an analytical perspective.
Selection of obligated actors	All suppliers of the fuel sources are subject to the quota unless they fall below a threshold value yet to be set; if required different approaches(e.g. for electricity, natural gas, district heating: consumer suppliers, heating oil: distributors).
Specification of the scope	Broad scope, all energy savings within the approved final energy consumption sectors can be accounted for (with the exception of transport); efficiency measures for processes that are directly subject to ETS are excluded.
Admissibility of types of measure	No restriction to measures that can be standardized, but also admission of heterogeneous (non-standardizable) measures. Measures in the information/ motivation sector cannot be accounted for.
Promotion of innovation	No differentiation in the accounting of measures.
Principles for selecting the baseline	General orientation toward the market average. Industrial cross-cutting technologies: product-specific minimum requirements from the EU Ecodesign Directive (2009/125/EC) (if implementation measure available). Industrial processes: process-specific benchmarks oriented at the best 10% (analogous to the allocation rules for emissions trading).
Selection of the accounting period	One-off accounting: for all measures the anticipated saving are discounted across the entire life cycle of a measure and allocated to the year of their implementation
Length of the obligation period	4 years; validity period of the certificates is limited to the respective obligation period
Mechanisms for increasing flexibility	Buy-out permissible; banking (i.e. transfer of saving titles to the following obligation period) permissible but restricted to 20% of the savings for each obligated company.
Allocation of costs	No specification necessary from an analytical perspective
Compliance check	Federal Agency for Energy Efficiency (BfEE) (though no specification necessary from an analytical perspective).
Permissible actors	No restrictions
Basic requirements for certificates	Electronic document within a national registration scheme (operated under state supervision); national register without interface to foreign registers.
ETS interface	No link

Table 2: Design proposal for an institutionalized energy-efficiency fund.

Design elements	Design proposal
Reference of the savings target	Reference final energy, saved final energy quantities weighted with primary-energy factors.
Differentiation of the saving target	In the case of the energy-efficiency fund the differentiation arises through the selection of the programs that are supported by the fund and their financial structure.
Selection of fuel sources	No specification required from an analytical perspective.
Selection of sectors	All consumer sectors; transport is initially excluded analogous to the saving quota.
Target groups of the fund	No restriction of the actors (except transport).
Selection of programs and measures	Orientation towards several selection criteria will probably be necessary (measurability, cost-benefit ratio, additionality), these should be transparent for all potential addressees. As a rule, supporting measures that go beyond a specific, clearly defined standard, (analogous to the baseline for the saving quota) only.
Organizational form	No specification required from an analytical perspective.
Monitoring	Supporting internal monitoring and external evaluation by independent experts in intervals of several years.

Table 3: Energy-saving potential in industry and total saving potential in the final energy consumption sectors (excl. transport) in Germany up to 2020.

	Average annual saving up to 2020	Cumulative annual saving in 2020
	TWh/a	TWh/a
Industry without EU-ETS (ambitious baseline)	2.4	29.3
Industry with EU-ETS (ambitious baseline)	3.9	47.1
Total final saving potential (incl. industry without EU-ETS, buildings, household appliances and services, excl. transport)	28.5	343.0

Source: Schlomann et al. 2012

measure. Instead of using the full investment costs of the new technology, the model works with differential costs. These are calculated as the difference between the costs of a conventional technology and an energy-efficient technology delivering the same energy service. Around 90 % of the energy saving potential in industry calculated here (see Table 3) is cost-effective under the given assumptions on energy prices (based on Prognos et al. 2010) and an assumed discount rate of 12 %. The remaining potential which are not yet cost-effective under these assumptions, can however reach cost-effectiveness in case of faster increasing energy prices or an accelerated economies of scale.

The total saving potential calculated against an ambitious baseline amounts to an average annual saving up to 2020 of around 2.4 TWh or a cumulative annual saving in 2020 of almost 30 TWh.[6] Compared to the total saving potential taking into account all final energy consumption sectors except transport, the potential which can be assigned to industry is relatively small, especially when not taking into account the energy consumption falling under the EU-ETS (Table 3). The by far biggest energy saving potential lies in the building sector.

Nevertheless, in order to reach energy saving targets as e.g. the 1.5 % energy-saving value in the draft of the new EU Energy-Efficiency Directive (defined there as 1.5 % of the energy sales volume of the previous year without transport), the saving potentials in all sectors have to be tapped, also from industry. Since according to calculations on the basis of the average annual final energy consumption (without transport but incl. ETS) of the years 2007 to 2010 in Germany according to the national energy balance sheet (AGEB 2011), an energy saving value of 1.5 % would mean an annual saving of roughly 26 TWh. This value is not far below the total saving potential of 28.5 TWh as it was calculated here (Table 3). This means that with an ambitious baseline for the design of an energy efficiency obligation scheme or alternative instruments as proposed here, such a target value of 1.5 % is to be considered ambitious for Germany and would require substantial input.[7] As to how ambitious a target specification is to be estimated depends in particular on the degree of additionality of the energy-saving measures that an instrument is intended to achieve. If, within the design of the instrument, no additionality were aimed at, the annual savings produced autonomously or on the basis of past political efforts must be applied as the minimum threshold. According to the ODYSSEE energy-efficiency indicators, these are around 1 % per year in Germany (Schlomann et al. 2009), meaning that 1.5 % saving per year would therefore be an easily achievable requirement. Therefore, it should once again be stressed that the level of the target alone does not determine how ambitious the target is in the respective country, but instead that the baseline for the individual measures should be set down in detail because this determines whether the target is ambitious or not.

CRITERIA FOR THE QUALITATIVE ANALYSIS

The quantitative analysis of the energy-impact and the costs of the policy instruments analysed here is completed by a qualitative analysis of additional criteria, which could not be assessed at a quantitative level. The following evaluation criteria are considered:

- *Market conformity and competitiveness* of the instrument options: these criteria are discussed and compared with an eye on obligated actors and energy service providers; in particular the conditions under which certificate trading could develop are examined.
- *Market for energy services*: here the possible effects of the new instruments on the market are examined.
- *Follow-on effects* of the instruments: follow-on effects such as distribution and structural effects as well as effects on the energy price trends that cannot be measured quantitatively are discussed.
- *Interactions* with existing instruments: each new instrument encounters an energy-policy landscape that is already characterized by other existing instruments; such interactions are considered in particular with an eye on emission trading, the Energy Saving Ordinance, the Ecodesign Directive and existing financial programs (such as that from KfW).
- *Political enforceability*: here the different points of view of the affected actors are considered and starting points derived for the enforceability of the instrument options in the political environment.

6. If the potential were calculated against a less ambitious „frozen efficiency" baseline, the resulting saving potential would be around 50 % higher (Schlomann et al. 2012).

7. It must, however, be taken into account is that the proposal for a new Energy-Efficiency Directive also permits the recognition of savings in the EU-ETS and in the transport sectors, which are both excluded here. Additionally, the saving target value of 26 TWh, which was roughly calculated based on the national energy balance, could become lower when taking into account that Article 6 of the proposal for the EED allows to exclude small distributors, small distribution system operators and small retail energy sales companies.

- *Refinancability* of the instruments: this examines the extent to which the instruments differ in terms of their funding; one focus is on the aspect of budget-independence of the funding.

Results of the quantitative evaluation of the policy instruments

The quantitative evaluation and comparison of the energy efficiency policy instruments analysed here is based on the energy saving potential calculations described above. Here, we follow a 3-step approach:

- *Step 1*: Derivation of the *energy-saving target* which should be achieved by the policy instruments from the calculated energy-saving potentials.
- *Step 2*: Evaluation of the *scope and quality* of the energy-saving measures: this presents the suitability of the instruments for the various energy-saving measures indicating which energy-saving measures are suitable to meet the defined targets through the individual instrument options or where potential limits lie in respect of meeting targets.
- *Step 3*: Calculation of the *costs* of the energy-saving measures: here the cost categories that apply to the various actors are differentiated and the cost paths of the individual instruments compared.

STEP 1: DERIVATION OF THE ENERGY-SAVING TARGET

Table 4 shows the energy-saving potentials actually taken into account for the determination of the energy-saving target and the energy-saving target derived from it in three variants (high, medium, low) which should be achieved by the policy instruments evaluated here. In the industry sector the EU-ETS processes are not included in creditable energy-saving potentials, as recommended for the design of the instruments. The targets are again set out both as average annual saving up to 2020 and also as cumulative annual saving in 2020.

The high energy-saving target points at a mainly profitable energy-saving potential under defined economic framework conditions and assumptions on the cost-effectiveness (sector-specific discount rates, consideration of the energy savings that can be achieved across the whole duration). For the medium and low energy-saving potential an exploitation of 2/3 and 1/3 respectively was assumed. The medium target corresponds to the microeconomically profitable potentials up to 2020, the low energy-saving target merely exploits part of the microeconomically profitable potential.

We did not define sector-specific energy-saving targets since in the design of the instruments, a broad scope was chosen for analytical reasons (see Table 1 and Table 2). Nevertheless, since for the high energy-saving target the total energy-saving potential must be exploited, the actual target for the industrial sector is equivalent to the annual energy-saving potential of around 2.4 TWh (Table 4).

STEP 2: SCOPE AND QUALITY OF THE ENERGY-SAVING MEASURES

The evaluation of the scope and quality of the instruments is based on the underlying assumption that the technical energy-saving measures implemented to meet the targets have different suitabilities for the policy instruments examined here. Table 5 shows how suitably the technical energy-saving measures can be addressed by the respective instrument options in a semi-quantitative evaluation scheme. Each energy-saving measure is individually evaluated using three criteria:

- Suitability of the instrument for removing barriers, that is to say, to what extent can the instrument address the specific barriers for the measure in question.
- Complexity of the measure or its suitability for standardization; this criterion results from experience in countries with energy efficiency obligation schemes whereby simple, standardizable measures are very suitable for implementation in the scope of an energy efficiency obligation scheme, whereas measures with a high level of complexity are not performed by actors, or only reluctantly.
- Complexity of the funding models required for the performance of an energy-saving measure.

This evaluation matrix (Table 5) represents the key foundation for the following quantitative evaluation of the different instruments in respect of the scope the saving they are intended to achieve. In each case only those energy-saving measures that are evaluated as "neutral (0), suitable (+) or very suitable (++)" are taken into account.

Some central points of the evaluation are presented below for the sectors and target applications under consideration. In industry a distinction must be made between the application areas of process and cross-cutting technologies. Measures that address the application of the best available technologies (BAT) for cross-cutting technologies are particularly suitable for an energy efficiency obligation scheme, while the optimization of management, and in particular the use of the best available technology in terms of the process technologies and innovations, are unsuitable for such a scheme due to the high investment costs, the long plant stand time and the difficulty in assessing the effect. For the financing instrument, on the other hand, all technical measures are classified as suitable, with the exception of the process innovations. Measures for optimized management, in contrast, are not suitable for direct financing; in this case information instruments such as energy management schemes are estimated to be more suitable. These can also suitably address measures for the use of the best available technologies, in particular for cross-cutting technologies (less so for process technologies). Similarly, the setting of ambitious minimum regulatory standards is similarly suitable. A regulatory approach for process technologies, in contrast, is evaluated as merely average due to the lack of standardization and the high costs and long lifetime.

Under these premises the energy-saving potentials that can be achieved through technical energy-saving measures can be presented according to their suitability for the various instruments (Table 6). In the area of cross-cutting technologies, the regulatory instruments with the setting of standards, energy efficiency obligation schemes or financial instruments are equally suitable for tapping into the potentials. This is because substitute acquisitions are made in the device sector whereby the investment decision is not a fundamental question. The mandatory specification of audits or energy management schemes

Table 4: Energy-saving potentials up to 2020 in Germany and the energy-saving target derived from it in three variants.

	Average annual saving up to 2020	Cumulative annual saving in 2020
	TWh/a	TWh/a
Energy-saving potential (ambitious baseline)		
Industry (without EU-ETS)	**2.4**	**29**
Total potential considered (without transport and EU-ETS)	**28.5**	**343**
Derived energy-saving target in three variants (only for the total potential)		
High (= total potential)	**29**	**343**
Medium (= 2/3 of the total potential)	**19**	**228**
Low (= 1/3 of the total potential)	**10**	**114**

Source: Based on model calculations by Fraunhofer ISI (see Table 3)

Table 5: Suitability of the energy-saving measures in the industrial sector for the different instruments (overall evaluation across all criteria).

Targeted end-use	Energy Efficiency Obligation Scheme	Financial grants / subsidies, Funds	Tax reduction / exemption	New / tightened regulation	Information / Advisory service
Cross-cutting technologies – Use of best available technology (BAT)	++	+	+	++	+
Cross-cutting technologies – Optimized operation	--	--	--	--	++
Process technologies – Use of best available technology (BAT)	-	o	-	+	o
Process technologies – Optimised operation	--	--	--	--	+
Process technologies – Waste heat recovery	o	+	o	+	+
Process technologies – Process innovation	--	-	--	--	o

and the consistent setting of minimum standards can be beneficial in this context. An energy efficiency obligation scheme can be effective in respect of the easily standardized measures, whereas the effect of a financing instrument is more beneficial for process-related measures.

The potential exploitation presented in Table 6 relates solely to the overall potential in industry and thus to the specified energy-saving target in its high variant. The Instruments address comparable potentials in the industry for they address the same kind of measures. Especially organisational measures, as well as in-depth process specific measures are not covered by these instruments properly. The main barrier in industry is not financing – which could be addressed by fiscal/financial measures – but information gaps. The remaining potentials therefore may be addressed by information and advisory service, but it is important to keep in mind, that information measures will not address these potentials on short terms, for investment cycles are the main driver for process improvement. Nevertheless, best practices show the high importance of these continuous informational measures. But for this instrument the success is much more difficult to be enforced, for it depends on the voluntary action of the industry. In contrast a subsidised technical measure will (more or less) directly lead to energy savings.

STEP 3: COSTS OF THE ENERGY-SAVING MEASURES

The overall costs of the instruments are differentiated here using various cost categories which are in turn incurred by various actors. These comprise administrative costs for the set-up, operation and monitoring of the instruments, program costs, i.e. the costs of the programs actually performed, as well as the additional investment costs, i.e. the differential costs for the investment in an energy-efficiency technology as compared to standard technology. These cost categories are further differentiated depending on whether their scope is dependent on the type of the energy-saving measures performed, whether they are differentiated by instrument or whether they are dependent on the programs performed to initiate the energy-saving measures.

These costs for the various instruments are quantified on the following basis:

- The administrative costs are estimated based on experience with the energy efficiency obligation or an institutionalized efficiency fund already available in other countries or comparable instruments in Germany (e.g. the KfW grant programs).
- Program costs that are particularly relevant to financial instruments are quantified by assuming a plausible subsidized

Table 6: Achievable energy-saving potentials in industry by suitability of the instruments (very good, good and average measures are considered).

	Cumulated annual potentials until 2020 (TWh) [1]	Annual potentials until 2020 (TWh/a) [1]	share of total potential[1]
Energy Efficiency Obligation Scheme	15	1.4	52%
Financial grants / subsidies, Funds	17	1.5	58%
Tax reduction / exemption	15	1.4	52%
New / tightened regulation	17	1.5	58%
Information / Advisory service	29	2.6	100%

[1] The figure only indicates the addressed potential by the instrument, a complete exploitation of the potential is not likely, especially in the case of information/advisory service.

Table 7: Total annual costs of the instruments for measures in industry.

Energy Efficiency Obligation Scheme	-198 M€
Financial grants / subsidies, Funds	-217 M€
Tax reduction / exemption	-210 M€
New / tightened regulation	-230 M€
Information / Advisory service	-363 M€

proportion of total additional investment costs – on the basis of experience gained from other countries and programs in Germany. A distinction is made between the program costs that are incurred in granting investment subsidies and those that are required for implementing the programs (program implementation costs) but do not flow directly into efficiency measures.

- The additional investment costs as compared to a standard technology can be derived directly from the model calculations on the energy-saving potentials, albeit they are reduced accordingly by the financing through financial incentives.

What is important for the consideration is that most of the cost categories considered are incurred during the deployment of any instrument option when comparable energy savings are to be achieved. The essential difference is in which actor incurs the costs in the first instance, whether and how they are foreseeably to be passed on and whether the funds are from the public or private sector. The costs up to the submission of the respective target amount are calculated in the order imposed on the carrier of the measures irrespective of how suitable or unsuitable the instrument is for the performance of energy-saving measures. Additional costs incurred for measures that are less suitable for the instrument were not taken into account.

All total costs are negative, so the costs for the saved energy outweigh the costs for the program and the investment. For the first four instruments have comparable saving potentials as well as cost structures they may achieve comparable cost savings. Information addresses higher saving potentials so the potential benefits are also higher.

Results of the qualitative evaluation of the policy instruments

MARKET CONFORMITY AND COMPETITIVENESS

Of the instruments examined here the saving quota is the only approach that is directly applicable to companies of the energy industry by imposing a concrete obligation on the companies. The other two instrument options are subject to other effective mechanisms. A quantity control (here: saving quota) that is managed using certificates is generally classified as particularly market-conform and competitively capable as a result of the trading element. Whether this is actually the case was examined comprehensively with regard to the effects on suppliers of different sizes and orientation, on the competitiveness of different fuel sources and on certificate trading.

The result of this analysis may be summarized as follows:

- In the competition between large and small companies the energy efficiency obligations represents a comparatively larger cost burden for smaller companies because larger companies have better opportunities to absorb their administrative and program costs via scaling effects.
- Obligated companies with a regional distribution structure have better implementation prerequisites than for instance new suppliers with a local anchoring and only a low level of customer proximity.
- No reliable statements as to whether a marked trade would arise under the German market conditions can be made for the saving quota instrument option with certificate trading.
- An allocation of the macroeconomic value of the search process for the most cost-effective energy-saving potentials induced in the scope of the saving quota depends to a large extent on the criteria based on which the alternative instruments such as efficiency funds, regulations or financial programs are designed. If the latter are strongly oriented toward the cost-potential curve, the benefit of the search process is lost for the saving quota.

EFFECTS ON THE MARKET FOR ENERGY SERVICES

The introduction of a saving quota would also enable the goal of strengthening the market for energy efficiency and energy services (e.g. in the form of new actors) to be explicitly pursued. This effect is often supposed for the instrument. However, broadly structured financial programs and other instruments can stimulate energy services, too.

The following evaluation takes into account the experience gained from other countries that have already introduced an energy efficiency obligation scheme. However, what needs to be considered is the fact that the situation in those countries cannot be directly compared with Germany because the number of obligated companies and thus potential market entrants in Germany would be a lot higher in Germany than in the other countries. Further, different definitions of the concept of "energy services" need to be considered. In the *narrower* sense this can be limited to services where the energy saving represents the strategic commercial objective; i.e. the customer is not sold energy in the form of electricity, gas etc., but instead a more complex service that may also include necessary investments in buildings and facilities technology (e.g. contracting, energy audits, energy management or energy monitoring). In the *broader* sense the definition includes all services that result in energy savings for the customers. In countries that have already introduced an energy efficiency obligation scheme, the broader definition is usually used. In Germany the definition in the current discussion is only common in the narrower sense. Nevertheless, subcontractor and consultancy services under the broader definition have long been established in Germany: a differentiated supplier spectrum has emerged in the course of regulatory measures and financial programs of recent decades.

As a result of the analysis it can initially be noted that an energy efficiency obligation scheme has an enlivening effect on the market for energy services in the broad sense above all where no or only a few actors have previously been active. In such contexts a saving obligation offers a cost-effective and comparatively simple-to-implement opportunity of implementing energy savings via market actors. A market for energy services in the broader sense is established. For Germany such a context is not a given, however, as the market for energy services (scope and diversity of suppliers and services offered, intensity of competition etc.) is already comparatively well-developed there, even if it is still a long way from a broad services market.

The effect of a saving obligation becomes more complex where services are already established on the market. Above all market size and the qualitative configuration of the measures need to be considered as influencing factors. In an already differentiated service spectrum as per the broader definition, the introduction of a saving obligation would lead to a higher concentration of providers in a static market, which could lead to predatory competition. The development of new services under the *narrower definition* would not be anticipated. That is to say, this situation would not result in an improvement as compared with the status quo and – if suppliers are crowded out – could even constitute a deterioration. The basic requirement for preventing such a development is therefore to extend the market and develop new services.

The development of new services pursuant to the narrower definition requires first of all the dismantling of specific barriers that exist in the market (e.g. through regulatory policies or risk minimization in the start-up phase etc.). This requires at least a combination of different instruments that, with a certain degree of political guidance, ensure that existing or new market actors focus on energy services in the narrower sense that were not previously available, or were only available to a limited extent.

FOLLOW-ON EFFECTS OF THE INSTRUMENTS

Due to methodological restrictions not all follow-on effects of the instruments can be considered in quantitative terms. This mainly includes distribution effects of the instruments, their possible impact on the energy price and a possible impact of the energy cost savings due to implemented energy efficiency measures on energy consumption (known as "rebound effect").

With regard to the **distribution effects** of the instruments, a distinction needs first to be made between the costs incurred directly by the various actors and the costs passed on. For energy efficiency obligation schemes, it can be assumed from experience from existing schemes in other countries that the obligated companies will pass on both the program costs as well as the administrative costs, usually via the energy price, to the end customer, if no regulation exists. This means that all end customers, and heavy users in particular, are initially burdened by higher energy prices, which fundamentally complies with the consumption principle. However, effectively the burden would largely fall on those demand segments that have the lowest elasticity in terms of demand (especially private households and smaller companies) in the first instance. In a financial scheme the distribution effects depend largely on the type of financing of the funding. With apportionment funding a passing on to the end customer can be assumed, as with a saving obligation; with funding from general state funds, costs are passed on to the tax payer. The distribution effects then also depend on which taxes are increased (income taxes or excise duties). For regulatory measures the large part of the costs falls on the investor obligated under the regulatory provisions.

In terms of further energy price effects it should be noted that a price increase induced by an instrument fundamentally increases the profitability of the energy-efficiency investments. This also tends to increase the scope of the savings achievable via the instruments.

As a further possible follow-on effect it should be taken into account that all investigated instruments are aimed at implementing additional energy-efficiency measures, which result in a reduction of the energy costs for those actors that are implementing such an investment in the respective scheme. The consequence can be direct **rebound effects** (negligent handling of energy) and indirect rebound effects across economic interrelations. However, as it is assumed here that all instruments will achieve comparable energy savings, the level of these effects will not be fundamentally different across the instruments.

INTERACTIONS WITH OTHER EXISTING INSTRUMENTS

With the introduction of a new guidance instrument for promoting energy efficiency, the interaction with the existing legal and funding framework needs to be precisely investigated. This applies in particular where the new instrument is introduced in a complimentary manner to the existing instruments and not as a substitute. As many of the energy efficiency policies existing in Germany are based on European regulations (e.g. minimum standards for electrical devices), any introduction of a new instrument would be on a complimentary basis in any case.

If we assume that both saving quota and efficiency funds as overarching umbrella instruments are designed such that they both initiate a comparable mix of measures, the interactions with the existing instruments are comparable in many respects. Interactions occur above all at the following levels:

- selection of the baseline against which savings in the scope of the saving quota or financing through the efficiency fund are accounted for positively
- selection of approved measures (scope of validity of the saving quota or target sectors that are financed through programs and measures of the efficiency fund)
- for financial incentive programs: possibly dual financing by different financing programs

In order to keep interactions to a minimum from the outset, or to exclude them as far as possible, the design of all instruments considered was selected to exploit synergies (e.g. in the context of the completion routines) with existing instruments (above all energy and electricity tax) and above all maximize the effect in terms of the intended target (additional saving of energy). This is reflected in particular in the selection of the baselines and energy-saving measures approved in the scope of the instruments examined. In the case of the existing financing programs where a potential energy efficiency obligation scheme and/or an efficiency fund is to be introduced, the financing conditions may need to be adapted.

POLITICAL ENFORCEABILITY

Alongside the evaluation of a guidance instrument on the basis of scientific methods (e.g. model calculations) the probability of a new instrument being introduced depends strongly on its (in part very subjective) assessment by politically relevant interest groups.

In particular there has to date only been little information on the acceptance of the instrument of the energy efficiency obligation scheme in Germany. Overall, a comparatively high level of uncertainty can be established regarding the effect of the approach. In the scope of an isolated evaluation of the instrument, above all many of the potentially obligated energy providers are very sceptically disposed to the instrument. Champions of the instrument can be found above all at the level of the associations and companies of the energy-efficiency sector (e.g. manufacturers of household and electrical devices), some of whom have developed their own implementation proposals for an energy efficiency obligation scheme.

However, the evaluation of the acceptance of the other instruments investigated also differs. The acceptance of an institutionalized efficiency fund is dependent to a large extent on its financing. If this is done by apportionment to the energy prices, the reaction of the consumers would probably be similar to the energy efficiency obligation scheme. Conversely, this instrument would be favoured by the energy suppliers because it is not connected to any obligation on the part of the companies. Experience shows that a tightening of regulatory provisions, or even the introduction of new obligations, results in considerable resistance on the part of the affected associations. Tighter enforcement of the existing regulatory provisions (e.g. Ecodesign), usually the responsibility of the Federal States, is being seen as a problem by them as it is connected to additional costs, while its acceptance amongst the other affected actors ought to be higher. This also applies to the expansion of the publicly-funded financing programs in the scope of the current range of instruments or a new efficiency fund. However, an expansion of this instrument would lead to an increased burden on the national budget and conflicts with the target of reducing debt and easing the burden on public budgets.

In sum, it can be determined that no clear preference for any of the instruments investigated can be identified with regard to the criterion of the political enforceability. There are champions and opponents for all instrument options.

REFINANCABILITY

With respect to the refinancability of energy-efficiency measures there are some fundamental differences between the instruments investigated here. Further, there are different financing options within an instrument, which in turn need to be evaluated differently.

For an energy efficiency obligation scheme this affects in particular the question of apportioning the additional costs to the end energy price or its potential regulation, the option for refinancing through the sale of certificates and the ratio of private-sector and public funds used for financing the scheme. The schemes already operating in other countries differ in respect of these features, some quite markedly. An energy efficiency obligation scheme permits budget-independent funding of energy-efficiency measures, albeit with the drawback of higher energy prices with associated follow-up effects such as allocation effects or low acceptance amongst the affected groups. Additional funding from the sale of surplus certificates may be possible in theory, but in most existing schemes (with the exception of Italy) trading does not take place de facto, or is excluded from the outset. This means that the level of private-sector funds that can be generated using this instrument is limited. Here the existing schemes in other countries show that further (public) funds or supplementary instruments of financing mechanisms need to be used, in particular for funding larger measures in the buildings sector, though not so much with regard to industry.

There are already a number of proposals from various expert reports (e.g. Irrek/ Thomas 2006, Ifeu/Wuppertal Institut 2009) for financing the energy-efficiency fund instrument in Germany, which are essentially differentiated by whether it is being financed from public funds or via cost apportionment or mixed financing from private- and public-sector capital. The following financing options are predominantly being discussed: financing from the revenue generated by the eco tax, from the Federal budget or the revenues generated by emissions trading (as in the case of existing energy and climate funds), via a surcharge on the energy price or energy bills, via public-private partnerships and via an “optional fund” that is funded, for instance, from the fines from the energy efficiency obligation scheme. We examined these funding options in terms of how targeted their allocation is, the market dynamic they generate and the potential mobilization of additional private-sector capital. In sum it can be determined that a design via consumption-dependent apportionment exhibits most benefits in respect of the tapping into private joint-funding, anticipated market dynamics and targeted allocation, although this option would currently be difficult to implement politically. Similar benefits apply to an "optional fund" with a certain limitation in terms of allocation. However, its implementation is only possible in the scope of a systemic shift of the instruments of efficiency policy. To that extent the simplest variant for implementation – public funding – appears to be pragmatically expedient, whereby the financing of the fund would in turn be subject to an upper ceiling due to the high priority of reducing national debt.

Similar restrictions apply to the instrument option "expansion and improvement of the existing range of instruments", for which no separate analysis was made, but instead a continuation of the existing financing from state funds (largely tax-funded or funded by the revenues from emissions trading) was assumed. Here both the expansion of financing as well as improved enforcement of regulatory provisions, and also supplementary informative and advising measures, require an additional level of funding that largely needs to come from public coffers.

Conclusions and Recommendations

Before, we evaluated the instruments examined here in terms of different criteria. As the analysis showed, the evaluation is extremely multi-layered and affects many actors. The instrument options shown here with their respective strengths and weaknesses therefore represent just an initial foundation for the further discussion about the development of a suitable mix of instruments in to achieve ambitious energy-efficiency objectives.

The starting point for the evaluation of the instruments was the specification of a concrete energy-saving target for 2020 in three variants (high, medium, low) which was determined based on the existing energy-efficiency potentials in the final energy consumption sectors (without transport) and are therefore set down a very ambitious reference development. The energy-saving target specified here thus includes *additional* energy savings that are not yet being achieved using the current instruments at their current intensity. In order to achieve both the national target of a reduction of the primary energy requirement by 20 % by 2020 as compared to 2008 and also the EU target of a 20 % saving as compared to a reference trend, the high energy-saving target defined here needs to be achieved. Excluding the transport sector, this comprises a required saving of 343 TWh (cumulative annual saving) in 2020, corresponding to an average annual saving of 29 TWh until 2020. The contribution of the industrial sector (without EU-ETS) amounts to around 29 TWh (cumulative annual savings) or 2.4 TWh (average annual savings), which is relatively low, but nevertheless necessary in order to achieve the ambitious target in the high variant.

On this basis the examination first looked at whether the *scope* of the instruments discussed here – an energy efficiency obligation scheme, enhanced financing in the previous form or via an institutionalized efficiency fund, tax instruments, the extension of regulations or information and advice – is suitable in each case for exploiting the energy-saving potentials determined here in the various consumption sectors and areas of application. The instruments of saving obligations, financing, tax incentives and regulations can each achieve about half of the high energy-saving target alone if they are developed accordingly, but none of these instruments on their own can exploit all efficiency potentials determined here in full. In order to achieve a high energy-saving target which covers most or even all energy saving potentials, a combination of the instruments examined is necessary in any case. Especially the instrument of information has to be developed furthermore, for it uniquely addresses saving potentials, the other instruments cannot address. For the implementation of cross-cutting technologies a combination of regulation and any of the inventive-based instruments is suitable.

In regard to the *cost aspects* we undertook a comprehensive cost evaluation that comprises both the (additional) investment costs required for the performance of energy-saving measures as well as all administrative and program costs. The largest cost block for all instruments are the investment costs. The remaining costs are also ultimately incurred for all instruments – though allocated differently – if they are to achieve comparable energy savings, as it was assumed here. Thus, the costs relating to the respective energy saving do not differ greatly between the individual measures. In contrast, the costs for achieving the targets do indeed differ due to the different suitability of the energy-saving measures for the individual instruments, as the instruments induce different energy-saving measures with different costs. Due to the different ranking of measures, the financing instruments initially implement attractive measures from a macroeconomic perspective, that is, measures with high depreciation rates, but long depreciation time frames if possible, while for the energy-efficiency obligation scheme the actor-specific perspective means that energy-saving measures that point to a high saving with a low financing volume are preferred. The information and advisory instruments have the low costs (or highest benefits) for the high energy-saving target, but will probably not deliver all the savings, which are addressed. The other instruments have comparable costs, so there's no real preference for one instrument in terms of costs. Above all energy-saving measures prescribed via regulatory provisions that initially exhibit benefits on the cost side have considerable implications regarding *distribution effects*, as the investment costs incurred for the implementation of such energy-saving measures fall entirely on the implementer. This could result in non-compliance and rejection if the costs increase for the companies.

This closely links the effects on distribution policy to the issue of *refinancing* of the costs that are incurred with the respective instruments. If public funds with unlimited availability were forthcoming in the longer term then, according to these results, the high energy-saving target could be achieved with a combination of new and increased regulation and traditional state financing and/or tax financing, tax incentives. But as the recent financing problems of the newly established energy and climate fund in Germany confirmed, the financing of energy efficiency measures by public funds is rather restricted and volatile. Therefore, the possibility of a budget-independence of the funding in particular supports a supplementary deployment of new instruments such as an EEO and/or an (apportionment-funded) energy-efficiency fund.

All instrument options considered are fundamentally market-compliant. For smaller obligated companies the saving quota represents a higher cost burden in relative terms in respect of the *competitiveness* as, in comparison to larger companies, they have fewer opportunities to reduce their administrative costs and program costs via scaling effects. Obligated companies with good regional distribution structures (e.g. public utilities), in turn, have better prerequisites for implementation as compared to new suppliers who often lack regional anchoring and customer proximity. Experience of energy efficiency obligation schemes in other European countries does not provide any conclusions as to whether and, if so, to what extent extensive certificate trading will develop in Germany.

In terms of the effects of the different instrument options on the *market for energy services*, as has been characteristic in Germany to date, the study showed that the definition of services to be used in the evaluation is decisive. For energy services in the wider sense, that is for contractor and planning services, energy efficiency obligation schemes can have a market-stimulating effect. For Germany, with a comparatively well-developed market for energy services (scope and diversity of suppliers and services on offer, intensity of competition etc.), the energy efficiency obligation scheme therefore may provide fewer benefits for the market in the broader sense in comparison to those countries that have already introduced such a scheme (but which have a less well-developed market for energy services).

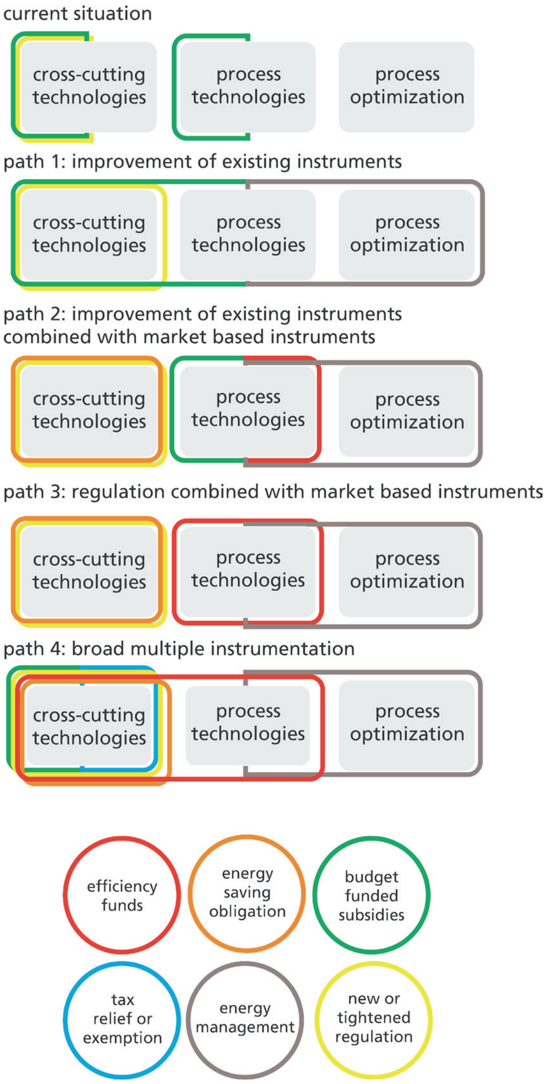

Figure 1. Different policy paths to promote industrial energy efficiency in Germany.

In terms of the *political enforceability* the results of this study show that all instrument options exhibit weak points that may vary depending on the actors and social groups affected as well as the respective design of the instruments. Finally, the analysis showed that no clear preference for any of the instrument options examined can be identified in terms of the criterion of political enforceability. There are champions and opponents for all instrument options.

This enables us to summarize in conclusion that by 2020 the high saving target as defined here cannot be achieved using any single one of the instruments examined here – regulations, financing in the traditional form or under the umbrella of an institutionalized efficiency fund, tax financing, tax incentives, information and advice or an energy efficiency obligation scheme – but instead via a combination of at least two of the instruments listed in combination with the informational instruments. This is both true at the level of all final consumption sectors and for the industrial sector. A key requirement is also that the combination that is ultimately selected fits the existing instrument landscape, although adapting the existing landscape should not be ruled out. There are also legal requirements that are not explicitly dealt with in the study but which can certainly have a decisive effect on the ultimate design of the instrument mix. Thus, potentials in the industry sector can only be addressed to a limited extent though public-sector financing because this is subject to EU state aid rules for medium-sized and large companies.

Based on the quantitative evaluation results, we have designed possible paths for a policy mix to promote energy efficiency which are in line with an exploitation of the full saving potential in industry (Figure 1):

- **Path 1: Improvement of existing instruments.** Path 1 describes a development, which is only based on the actual instruments which are already implemented, but which have to be significantly improved and further developed. An overlap of instruments addressing the same targeted end-use is not intended, though not fully avoidable. In industry, regulation is mainly suitable for cross-cutting technologies, improvements both include the setting of ambitious minimum energy efficiency standard for more energy-related products technologies and an enforcement of the compliance control with regard to already existing standards. Traditional financial instruments can also address cross-cutting technologies, but are also suitable for some part of process technologies. They should be restricted to technologies which go beyond the standards in order to avoid overlaps. Process optimization should preferentially be addressed by a further spread of energy management systems, which can also address at least parts of the process technologies.
- **Path 2: Improvement of existing instruments combined with market-based instruments.** In path 2, the expansion of budget-funded financial support programs is partly replaced by an newly introduced energy efficiency obligation scheme, which mainly addresses industrial cross-cutting technologies. Again, the EEO should only address energy efficiency measures which go beyond the regulation. In addition, an efficiency fund can support further support programs for industrial process technologies.

- **Path 3: Regulation combined with market based instruments.** In path 3, the financial subsidies funded by the public budget are completely replaced by EEOs and an energy efficiency fund which both allow an budget-independent financing. As in path 2, overlaps between the instruments are tried to be avoided as far as possible.
- **Path 4: Broad multiple instrumentation.** Path 4 allows a relatively broad multiple instrumentation. This gives more room for new instruments which both address cross-cutting and process technologies. Only process optimization is still mainly addressed by energy management systems. This approach could contribute to a more rapid exploitation of the energy saving potentials due to the broader spectrum of offers. In addition, the scope of actors in the energy efficiency market will be maximised. This must, however, be weighed against compared to paths which try to avoid a significant degree of overlap (espacially the higher complexity of the instrument mix, higher transaction costs due to parallel structures and more inefficiencies due to the higher degree of interaction).

However, the final decision on the mix of instruments and the path that is actually chosen can only be decided after careful consideration and weighting of the various qualitative evaluation criteria described above. The main argument for a broader role of new instruments, as described in path 2 and path 3, is the probably higher stability of the financing of energy efficiency measures.

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