EVALUATION OF DIFFERENT POLICY INSTRUMENTS TO PROMOTE INDUSTRIAL ENERGY EFFICIENCY IN A NATIONAL CONTEXT

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Background

European Union

- Indicative energy saving target of the EU: reduction of primary energy consumption by 20% compared to a trend → this target is currently far from achieving
- The proposal for a new EU Energy Efficiency Directive (EED) from June 2011 demands a national indicative energy efficiency target (Art. 3) and includes several additional energy saving policies, e.g. the introduction of energy efficiency obligations in all EU MS (Art. 6) or of mandatory energy audits and energy management systems (Art. 7)

The German "Energiewende" from 2011 and the Energy Concept from 2010

- Complete phase-out of nuclear energy until 2022; substitution mainly by renewable energies and energy efficiency
- Setting of national energy efficiency targets for 2020 and 2050 : reduction of primary energy consumption by 20% (2050: 50 %) and electricity consumption by 10% (2050: 25 %) compared to 2008
- All energy consumption sectors have to contribute to achieve these targets, also industry
- But: only a few policy instruments explicitly addressing the industrial sector have been implemented or proposed up to now apart from EU-ETS and EU-Ecodesign; in addition, industry profits from far-reaching exemptions from energy taxes in Germany.

Objective

Cost-benefit analysis of additional policy instruments to increase energy efficiency in industry (case of Germany)

- Energy efficiency obligation scheme (EEO)
- Energy-efficiency fund (institutionalized)
- Expansion and improvement of the existing energy efficiency policies (mix of regulation, financial incentives and information)

The analysis is based on a research project funded by the German Ministry of Economics and Technology.

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Methodological approach

(1) Comparable design of the policy instruments as a basis for the quantitative and qualitative evaluation

(2) Calculation of energy-saving potentials in industry and there costs, using a bottom-up simulation model for the industrial sector in Germany

- → Basis for the setting of an energy-saving target which should be achieved by the instruments
- → Basis for the quantitative evaluation of the instruments with regard to the achieved savings and their costs

(3) Qualitative analysis of additional evaluation criteria:

- Market conformity of the instruments and impact on competitiveness
- Impact on the market for energy services
- Distribution and price effects
- Interaction with existing instruments
- Political enforceability
- Refinancing of the costs of the instruments

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Derivation of the energy-saving target

	Average annual saving up to 2020 TWh/a	Cumulative annual saving in 2020 TWh/a
Energy-saving potential (ambitious baseline)		
Industry (without EU-ETS)	2.4 (with EU-ETS: 3.9)	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

Yearly savings for Germany under the new EED: roughly 25 TWh

- The energy saving target which should be achieved by the instruments was derived from the existing energy-saving potential in industry and other sectors
- The potentials are **additional** potentials exceeding a very ambitious baseline.
- This was part of the design of the instruments: only technical energy saving measures exceeding minimum efficiency standards or benchmarks for processes are allowed.

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Basis for the quantitative evaluation: suitability of the technical energy-saving measures for the different policy instruments

Targeted end-use	Energy Efficiency Obligation Scheme	Financial grants / subsidies, Funds	Tax reduction / exemption	New / tighten 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

Results of the quantitative evaluation

Impact on energy savings

- Around 50 – 60 % of the energy-saving potential can be tapped by technical saving measures which can be suitably addressed by EEO‘s, financial instruments and/or regulations. In terms of impact, these instruments do not differ a lot.
- For the remaining part of the potential, information and advisory service is more suitable in order to exploit the potentials (esp. optimized operation).
- But: no instrument alone is sufficient to tap the whole potential!

Impact on costs

- The following costs have been taken into account: administrative costs, program costs, additional investment costs compared to a standard technology
- Most of these costs are incurred for all instruments, when comparable energy savings are to be achieved. The main difference is, who bears the costs and if the funds are from the public budget or from the private sector.
- The total annual costs for all instruments are negative, i.e. the costs for the saved energy outweigh the administrative, program and investment costs!

Results of the qualitative evaluation / 1

Market conformity and competitiveness

- EEOs: Large obliged companies and companies with a regional distribution system may have a competitive advantage.
- The benefit of EEOs in the search process for the most cost-effective saving potentials mainly depends on the appropriate design of alternative instruments.

Effects on the market for energy services

- EEOs are suitable to develop and enlarge the market for energy services. In Germany, however, this market is comparatively well-developed.
- In an already existing market, the introduction of a new instrument can lead to a higher concentration of providers. The risk is limited in a growing market.

Distribution effects

- Distinction between the costs incurred directly and the costs passed on.
- Regulation: private investor and state (esp. for compliance control)
- Public financing (taxes, subsidies): costs are passed on to the tax payer
- EEOs, levy on energy price: mainly demand segments with lowest elasticity of demand (if energy prices are not regulated)

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Results of the qualitative evaluation / 2

Interaction with existing instruments

- We tried to minimize the interaction by a suitable design of the instruments (ambitious baseline, only additional energy savings). But in case of a new instrument, the financing conditions of existing programs may need to be adapted.

Political enforceability in Germany

- EEOs: many of the potentially obliged energy providers are very critical, whereas esp. the energy efficiency industry is favoring the instrument.
- Energy efficiency fund: acceptance mainly depends on the financing (levy on energy price, public budget, revenues from emission trading…..)
- Public financing programs: high acceptance, but budget restrictions
- New regulation: opposed by affected associations; control of compliance is very low.

Refinancing of the costs of the instruments

- The possibility of a budget-independent financing of energy efficiency is one of the most important arguments in favor of EEOs (and for other not public-financed instruments) → generation of more capital from the private sector for energy efficiency investments
- More relevant for energy efficiency measures in industry (which are often highly profitable) than for deep renovations of buildings sector (high investments and a long pay-back time)

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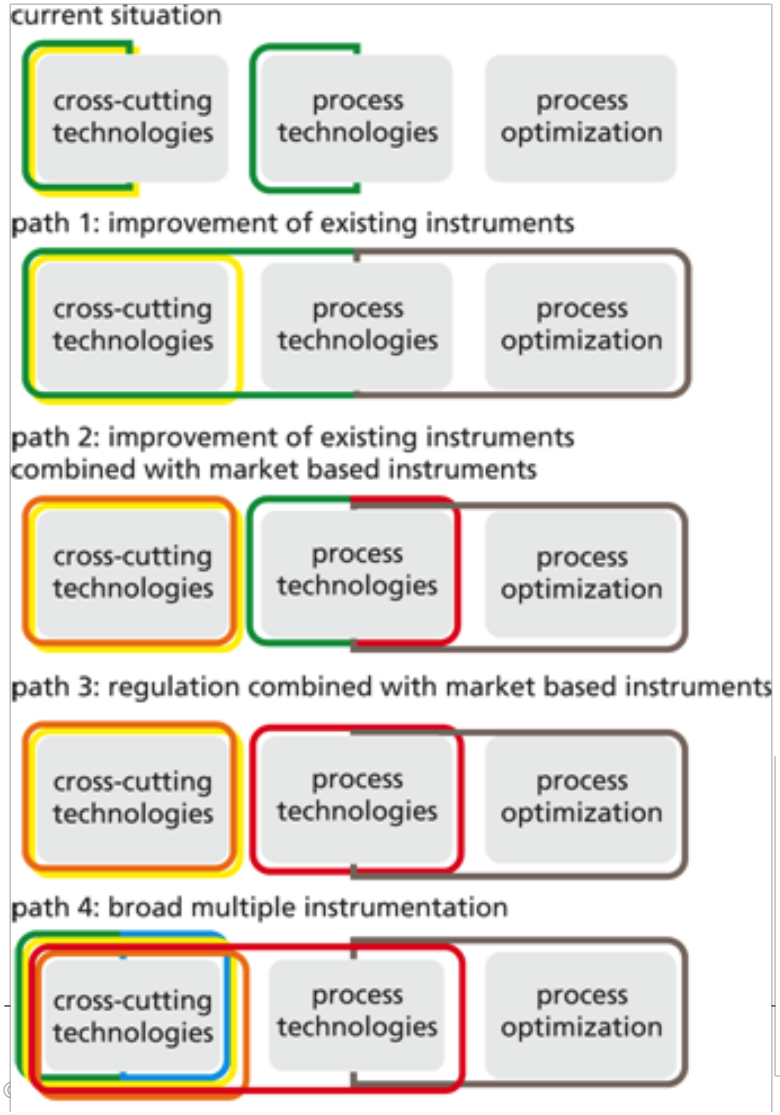
Different policy paths to promote industrial energy efficiency in Germany



In principle, all paths are in line with a full exploitation of the calculated saving potentials for industry.

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Conclusions and Recommendations

- No policy instrument alone is sufficient to tap the calculated energy saving potential for industry → we need a suitable mix of instruments
- The 4 policy paths developed are all in line with a full tapping of the potentials
- There are good arguments also in Germany for a combination of the traditional mix (regulation + public-financed promotion programs) with new instruments (EEOs, energy efficiency fund) in order to generate more private capital for energy efficiency and a more stable financing and to enlarge the scope of actors in the market of energy efficiency
  → recommendation of paths 2 or 3 (without significant overlap of instruments)
- A broad multiple instrumentation (path 4) has some advantages, but also may occur more inefficiencies due to double-instrumentation
- 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
- The far-reaching exemptions of industry from energy taxes in Germany are counterproductive with regard to energy efficiency

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Contact

Thank you for your attention

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