Federal Office
for Economic Affairs
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FEDERAL
ENERGY
EFFICIENCY
CENTER

Analysis of a new Support Scheme for Energy Efficiency Investments for Industry and Business, Commerce and Services in Germany

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Federal Energy Efficiency Center*

- **“designated national authority” pursuant to Energy Services Directive (2006/32/EC)**
  - established in 2010 within the BAFA by order of the Federal Ministry for Economic Affairs and Technology (BMWi)
  - tasks defined in Energy Efficiency Services Act** (last amended in 2015)

- **special access to information due to mandate**
  - supporting BMWi scientifically in all matters of energy savings and energy efficiency
    - incl. advice on subsidy schemes, overseeing evaluations, technical expertise and reporting
  - observing and evaluating the market for energy services and energy efficiency measures
  - ➢ self-managed budget for procuring external knowledge and additional funds for special tasks
    - main client: energy efficiency departments of the BMWi

* Bundesstelle für Energieeffizienz
** Energiedienstleistungsgesetz

OBJECTIVE OF THE PRESENTATION

Fundamental reform of federal subsidy schemes for energy efficiency

- **Federal Government provides 3bn EUR p.a. in subsidies for energy efficiency across all sectors**
  - public funding expected to contribute about one third of the envisioned energy savings
  - funding saw less demand than anticipated
- **until 2015, Germany had reduced its primary energy demand by 7.6% against 2008**
  - ➢ further effort needed to reach 20% by 2020
- **BMWi determined a new funding strategy for energy efficiency and heat from renewables**

Presentation shows the relevance and rationale of changes in subsidy scheme for Industry and Businesses, Commerce and Services (BCS).

Funding for Investments in Energy efficiency in Industry and BCS

2017	post reform (Q4 2018)
highly efficient cross-cutting technologies and systemic optimization*	merged into one program
energy efficient production processes***	
utilization of waste heat**	
renewable energies for industrial processes*, **	
energy management systems*	

managed for BMWi by *BAFA **KfW *** KIT

Initial Situation: High degree of heterogeneity and low degree of transparency

- **Isolated federal government programs for energy efficiency investments in industry and BCS**
  - program structure strongly oriented at EU Regulation (651/2014) declaring certain categories of aid compatible with the internal market
  - very concrete elements necessitating differentiation of costs for one investment project to fit schemes
  - multitude of support mechanisms (e.g. de-minimis grants or grants in accordance with other EU regulations; subsidized loans or competitions with an array of special conditions) leasing to high variety of
    - procedures and
    - presentation thereof

- **Programs differed in several dimensions**
  - heterogeneous target groups (e.g. SMEs, manufacturing industry, certain types of municipal companies)
  - variety regarding incorporation of intermediaries and efficiency services providers
  - differing linkages to (other) support schemes (for energy services and energy efficiency investments)
  - few concerted communication measures, no defined level of communication intensity

EFFICIENCY GAP

Large role of industry and BCS for German energy transition

- **Sectors accounted for a significant portion of German final energy demand in 2016**
  - Industry* responsible for 28% and business, commerce and services for 16% of final demand [2]
  - energy usage for some applications is greatly dispersed
    - most significant utilization of petroleum in BCS** is space heating
    - about 70% of mechanical energy in industry are consumed by electrical engines [1]
  - while energy usage for other applications is particularly concentrated
    - energy intensive industry*** accounts for more than 70% of the total energy used in industry [2]
    - manufacturing of basic metals uses almost 70% of industry's total energy produced from hard coal and lignite for process heat [2]

- **Efficiency potential in industry and BCS is particularly valuable for energy system**
  - defossilization of process heat is technologically challenging and relatively expensive (e.g. P2X, process innovation)
  - usage of waste heat for space heating in non-residential buildings

* encompassing mining, quarrying and manufacturing (WZ08: 05-33)

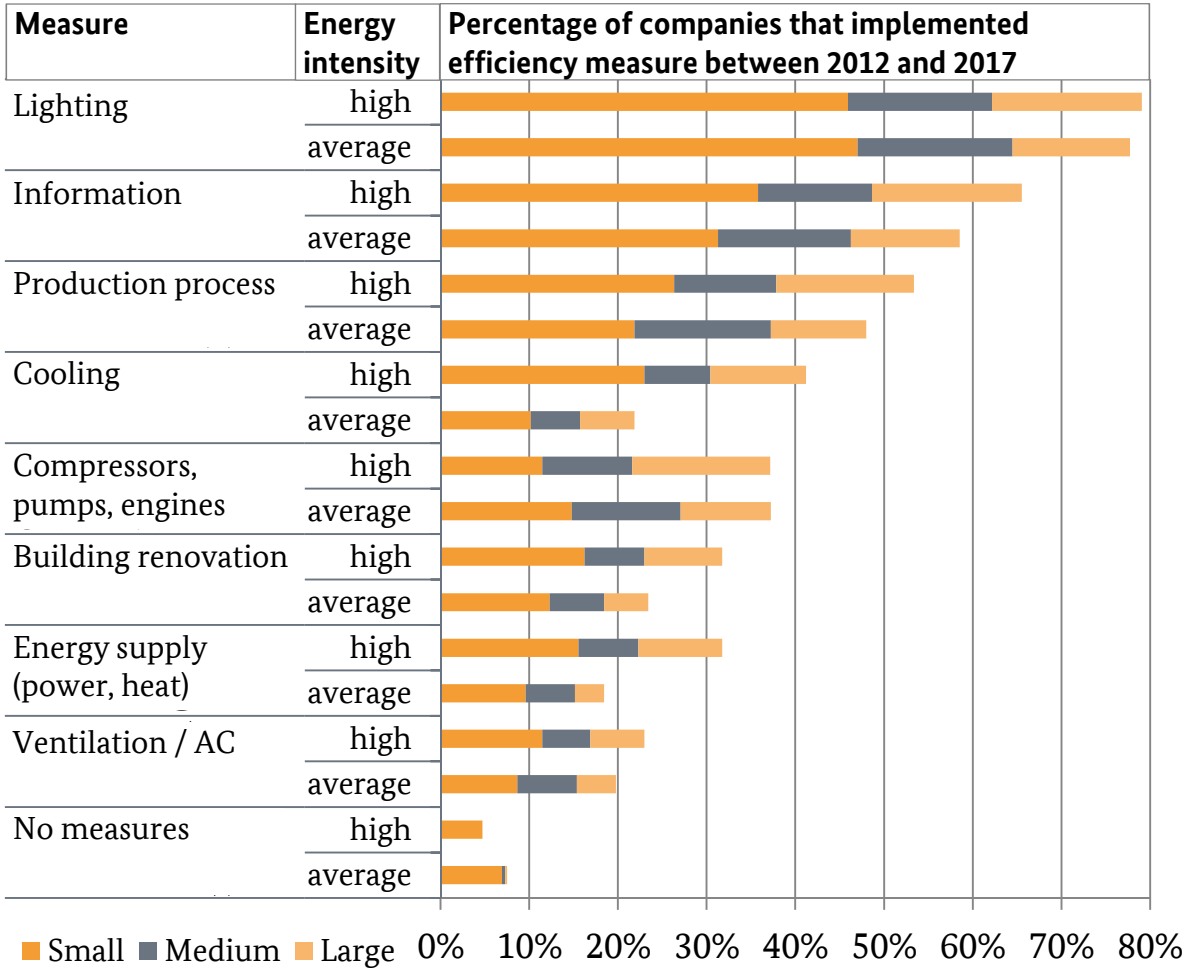
** businesses, commerce and services

*** energy procurement cost more than 3% of turnover or energy taxes more than 0.5% of value added: manufacturing of food products, paper and paper products, chemicals and chemical products, other non-metallic mineral products, and basic metals

Economic energy efficiency potential not fully leveraged

- **Relevance of energy efficiency important determinant for action [5]**
  - linked to share of energy cost in overall cost [5]
  - even in energy intensive enterprises, high investments in energy efficiency relatively rare

- **in-house expertise greatly helps implementation**
  - energy efficiency is rarely sole motivator for investment otherwise forgotten
  - quality of efficiency measure difficult to determine
  - ➢ larger enterprises usually have more resources for planning



ESD Company Survey 2017 [5], $n_{(high)}$=148, $n_{(other)}$=521, WZ08: 10-33

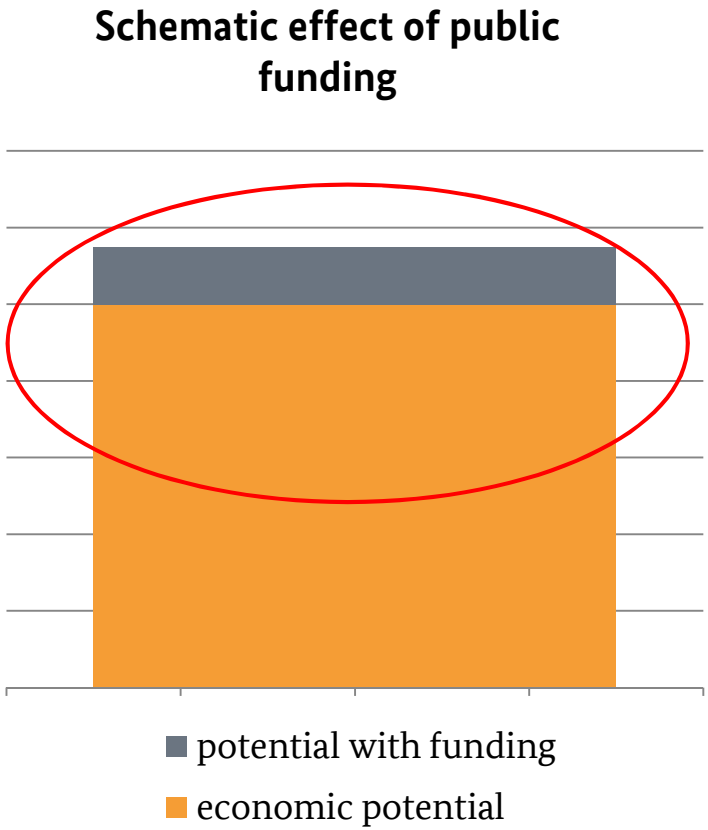
Barriers for the implementation of energy efficiency measures by type

- **Fundamental barriers**
  - shortage of time and capacity in industry and BCS for treating non-core issues like energy efficiency [5]
  - lack of knowledge regarding energy efficiency potential or wrong assessment thereof and reservation against paying for energy efficiency services [5]
  - high expectation regarding repayment period for (strategic) investments in energy efficiency
- **Different types of energy efficiency measures also meet specific barriers**
  - Investments across the board
    - above standard energy efficient options customarily cost more than standard options
    - communicative challenge: eco-design already requires significantly improved performance
  - Integrated approaches including usage of renewables
    - require special knowledge often not available in-house (also pertains to use of renewables)
    - willingness to reduce redundancy
  - Innovation
    - falling share of innovative firms [8]
    - particularly smaller firms withdrew from innovation as competitive advantages shifted to costs [9]
  - Measurement and documentation of energy use
    - implementation of adequate energy controlling requires equipment and manpower (relatively high cost) [5}
    - (economic) advantages of energy management systems (disregarding special schemes) difficult to prove [i.e. 3]

SUPPORTING THE IMPLEMENTATION OF ENERGY EFFICIENCY MEASURES WITH PUBLIC FUNDING

Leveraging the economic and the not-yet economic potential...

- **Tackles transaction cost by introducing expertise**
  - information regarding desirable energy efficiency levels
  - ideas for energy efficiency measures through conditions
  - guidelines for planning / concepts / measurement
  - quality assurance systems for energy service providers / planners
- **Make energy efficiency more relevant for companies**
  - provide public support for investors (feature as best practice...)
  - establish energy efficiency as social norm / goal
  - generate publicity for energy efficiency
- **Increase economic attractiveness of energy efficiency projects**



Why were subsidy schemes not attractive enough prior to reform?

- **far less than half of the target group is aware of support schemes available for industry (e.g. evaluations [10,11])**
  - of industrial companies surveyed in a randomized telephone survey [5]
    - about 13% claimed they benefitted from a subsidy scheme for energy efficiency and considered this the main reason for using an energy efficiency survey
    - about 24% claimed they have benefitted from a federal support scheme for energy efficiency
- **level of expected financial support seen not to warrant "hassle"**
  - high transaction cost prior to, during and post project implementation
    - time lag introduced by acceptance process problematic, if investment is urgent (e.g. triggered by equipment failure) [preliminary result of unpublished evaluation]
    - funding for complex measures requires additional data collection and planning (i.e. [5])
      - ➢ improves projects and makes results tangible, but seen as burdens that cause extra cost
      - ➢ involvement of experts sometimes considered useless / competition by those responsible for operation
  - technological requirements for funding significantly above standard (also in cost)
    - additional benefits disregarded (i.e. improved control over processes, higher life-time of equipment, higher comfort for workers)

The new support scheme for energy efficiency investments for industry and BCS

- **Greatly increased transparency for applicants and energy efficiency service providers**
  - harmonized requirements, modes and levels of support, forms, calculation methods
  - unchanged: well-received funding of replacement of cross-cutting technologies with highly efficient solutions
  - one program for all complex investments that mitigate emissions from production and processing
  - application for funding for all complex investments based on one concept (reliable & pragmatic quality assurance)
    - amount of mitigated emissions of greenhouse gases per additional investment is central indicator
- **Clear incorporation of energy service providers and solid support for energy data management**
- **Better communication**
  - professional tailored communication for specific sub-groups (types of businesses) with coordinated intensity
  - broad incorporation of stakeholders
  - message to include non-monetary benefits of funding procedures (quality assurance)
  - improved information on approval process and on its duration
- **Support will fit real investment projects**
  - no need to artificially split project costs to fit different subsidy schemes
  - synergies allow for quicker processing
  - increased service level in direct communication with investors and energy efficiency service providers

THANK YOU

Some pertinent figures

PJ (2016) [2]	Space heating	Hot water	Other process heat	Air conditioning	Process refrigeration	Mechanical energy	ICT	Lighting
Industry	**159,4**	**16,4**	**1713,1**	**17,4**	**17,8**	**591,5**	**33,2**	**32,4**
o/w petroleum	9,1	0,8	45,1	0	0	0	0,7	
o/w hard coal and lignite	6,3	0,5	432,5	0	0	0	0	0
BCS	**720,8**	**68,0**	**102,8**	**13,6**	**46,3**	**250,2**	**86,3**	**192,3**
o/w petroleum	160,0	12,4	12,8	0	0	115,4	0	0
Total	**880,2**	**84,4**	**1815,9**	**31,0**	**64,1**	**841,7**	**119,5**	**224,7**

		Share of energy cost in overall cost				
		> 1%	1% to > 5%	5% to > 10%	10% to > 30%	≥ 30%
Relevance	1 to 2	38%	13%	6%	4%	5%
	3 to 4	15%	22%	11%	8%	5%
	5 to 6	18%	23%	22%	14%	10%
	7 to 8	18%	32%	39%	48%	30%
	9 to 10	11%	11%	22%	27%	50%

*1= „low“ to 10 = „high“;
ESD Company Survey 2017, n=1932 [5]

- **Estimations regarding exact economic potential vary greatly**
  - According to data from (voluntary) energy efficiency networks, non-SMEs (EU definition) from all branches have an efficiency potential of around 10% over three years [3]
    - Translates to about 340 PJ
  - Voluntary energy analyses among SMEs from the industry sector reveal potential of over 17% [preliminary results of unpublished evaluation]
    - Translates to about 100 PJ
  - Mandatory energy audits (art. 8) found energy efficiency potential in non-SMEs from different branches of the industry sector (excl. fuels for vehicles) between 1.9%. and 3.9% over three years [3]
    - Translates to about 45 PJ for non-SMEs from the industry sector
  - Scientific study of cost of energy savings in energy intensive industry based on detailed analysis over 160 different energy efficiency measures for processes sees potential of over 10% between 2013 and 2035 [4]
    - Translates to about 134 PJ
- **Measurement and documentation of energy use and savings pave the way for (continuous) engagement to increase energy efficiency.** [6]

Characterization of energy efficiency measures

- **Efficiency potential in cross-cutting technologies (like electrical engines) dispersed with large appliances oftentimes rather efficient** [1]
  - ➢ Leveraging potential requires **investments across the board** (companies of all sizes from all sectors)

- Highest specific energy efficiency gains are realized with optimization and controlling of manufacturing equipment, pressurized air systems and heat systems (apart from lighting) [6]
  - ➢ **Integrated approaches** to energy efficiency improvements based on ***thorough analysis***

- **From technological perspective, traditional core processes for energy intensive production are offer little remaining potential for incremental efficiency improvements**
  - New processes needed (i.e. steel production with Hirsana process, paper production with black liquor, development and production of low-CO_2 cements.) [7]
  - ➢ **Innovation** paramount to reaching energy efficiency and climate goals

*Ultra Low CO2 Steelmaking

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