Role of standards, certificates and financial incentives for improving Energy Efficiency in Buildings
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
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- federally owned non-profit organization
- supports the German Government in achieving its objectives in international cooperation for sustainable development and active in international education work
- works in 130 countries worldwide with ~17,000 employees
Content

- relevance of energy performance standards in Eastern Europe
- building energy standards and implementation in Germany
- energy certificates
- incentive mechanisms
- conclusions
Relevance

tCO2/capita

source: IEA 2008
Energy Standards

Ivano-Frankivsk

Karlsruhe
Evolution of energy standards in Germany

![Graph showing the evolution of energy standards in Germany, comparing different standards such as WSVO 84, WSVO 95, EnEV 2002, KFW-60, KFW-40, and Passivhaus. The x-axis represents the years, and the y-axis represents the energy requirement. The graph highlights the increase in energy efficiency over time.]
System boundaries and definitions

Bedarfsnachweis gemäß EnEV

Bilanzgrenze „Bohrloch“:
Primärenergiebedarf

Bilanzgrenze Raum:
Heizwärmebedarf

Bilanzgrenze Gebäude:
Heizenergiebedarf

Q_S, Q_T, Q_V, Q_h, Q_c, Q_e, Q_d, Q_s, Q_g
Relevant norms for EnEV in Germany

- DIN V 4108-6: Berechnung des Jahres-Heizwärme- und Heizenergiebedarfs mit den Randbedingungen für Deutschland
- DIN V 4701-10: Ermittlung der Kennwerte zur energetischen Bewertung heiz- und raumluftechnischer Anlagen
- DIN EN 832: Wärmetechnisches Verhalten von Gebäuden, Berechnung des Heizenergiebedarfs
- DIN EN 673: Ermittlung der Wärmedurchgangskoeffizienten von Verglasungen
- DIN EN 410: Gesamtenergiedurchlassgrad von Verglasungen
- DIN EN ISO 10077: Ermittlung der Wärmedurchgangskoeffizienten von Fenstern
- DIN 4108-2: Höchstzulässige Sonneneintragskennwerte bei der Berechnung des sommerlichen Wärmeschutzes
- DIN EN 13829: Anforderungen an die Dichtheit des Gebäudes
- DIN EN ISO 13789: Wärmeübertragende Umfassungsfläche A und Gebäudevolumen V
- VDI 3807: Energieverbrauchswerte für Gebäude
- DIN 4108 Bbl 2: Planungsbeispiele Wärmebrücken
- DIN EN ISO 6946: Ermittlung der Wärmedurchgangskoeffizienten opaker Bauteile
Scheme of a holistic balance according DIN 18599 (non residential buildings)
What is an Energy Certificate?

- an Energy Certificate is a document stating the energy quality of a building and issued under standardized framework conditions it will be used
  1. to verify the energetic requirements of buildings (new construction, retrofitting, extensions)
  2. for documentation of the energy quality of existing buildings

- the energy certificate is for information and should give the possibility to compare the energy quality of different buildings
Goals of the Energy Certificate

- energy saving through demand reduction
- information and awareness raising
- energy efficiency as a sign of quality for buildings
- marketing instrument for the housing industry and for building owners > market transparency
- showing potential to save energy
- creating incentives for innovation and investment for existing buildings > impulse for the construction economy (... and auditors)
Awareness

…what does yours need per square meter?

Quelle: dena
Goals of the Energy Certificate

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Which principles need to be taken into account while issuing an energy certificate?

1. Energy certificates indicate the **calculated energy demand** or the **measured energy use**

2. Energy certificates need to be issued for the whole building – in case of mixed usage in special cases separate for housing and non-housing

3. The energy certificate counts for 10 years
Examples: Energy Certificates
Important Tasks

- responsibility for national implementation and enforcement
- responsibility for application > mostly municipalities
- standardized procedure, e.g. verification with building permit
- certification for auditors
- information campaigns
Energy demand based certificate according to EnEV 2007

- based on an energy demand calculation taking into account the whole building envelope (walls, windows, roof, basement and systems engineering and assess their specific energy performance
- most recommended in combination with retrofitting measures
- contained objective figures concerning the building and systems engineering quality, regardless of user behavior
- detailed data collection and on-site survey necessary
- the energy-demand-index will be calculated with software support using a simulation of the building for standardized conditions
Measured energy certificate according to EnEV 2007

- issued on the basis of the measured energy use of the last 3 years
  The data will be provided by the owner using e.g. the bills for
  heating costs, measures usage data, invoices from energy
  providers
- depending on the behavior of the user
- cheap and simple procedure
- the energy-usage-index will be a calculated average using the
  measured energy use data during several years with graded
  weather conditions
Influence of the user

- energy consumption and heating costs in a semi-detached building for different user behaviour; new construction standard

Quelle: BMVBS 2008
Acceptance of an energy certificate in residential sector

Marktakzeptanz
Beurteilung des Passes durch die Eigentümer

Über 80 Prozent der privaten Eigentümer würden den Pass sehr oder überwiegend empfehlen

Anteil an den Befragten

Selbstnutzende Eigentümer
Private Vermieter
Wohnungsbau-gesellschaften

EnEV-Novelle und Energieausweis
User evaluation concerning understandability

Verbraucherbefragung:
Wie finden Sie den Energiepass für Gebäude?

- Understandable: 9.0%, 9.0%, 21.9%, 38.1%, Ø 3.6
- Not understandable: 21.9%
Financial Incentive Mechanisms
Financial incentive mechanisms

Market solutions:
- increasing energy tariffs

> social effects and effects on the budget policy?
- Social policy: possible compensation to low income households by targeted transfer payouts
- Budget: On the one hand, high social costs, on the other – low costs on energy subsidies

→ Quantitative assessment can be useful to find the effects for energy savings and the national budget
Reasons for state support programs

- Only higher energy tariffs (marketing solution) are not enough to invest in energy saving
- Reason: numerous practical obstacles
  - Information and transaction costs
  - Reduced access to credits
  - Landlord-tenant dilemma (investor/developer – buyer)
- Many countries implement large-scale national programs (not a purely market solution)
- Numerous practical obstacles and a huge energy efficiency potential
  - Positive effects on energy saving are good reasons to implement national support programs
Development of electricity tariffs in Ukraine

Strom Tarif (Ukraine)

Apr - 99  | Mai - 06  | Sep - 06
1.1 (33%) | 1.6 (20%) | 2.0
Development of heating tariff in Ukraine

Fernwärme Tarif (Kharkiv)

Euro ct / kWh

Jan - 02  Apr - 03  Okt - 03  Okt - 06  Nov - 08  Dez - 08

0.41  0.41  0.55  1.31  1.76  1.83

0%  18%  58%  26%  4%  4%

Tariff rises about 350 % during the last 6 years !!!
Electricity tariffs in Eastern Europe

- Bulgarien
- Estland
- Lettland
- Litauen
- Malta
- Tschechische Republik
- Zypern
- Türkei
- Polen
- Rumänien
- Slowakei
- Ungarn
- Ukraine
- Deutschland

Quelle: Statistisches Bundesamt, Wiesbaden 2010

* 1. HJ 2009
Gas tariffs in Eastern Europe

- Bulgaria
- Estonia
- Latvia
- Lithuania
- Czech Republic
- Turkey
- Poland
- Romania
- Slovakia
- Hungary
- Ukraine
- Germany

Gas prices (incl. taxes) [Ct/kWh]

- MOE States
- Immediate Neighbors of Ukraine

Quelle: Statistisches Bundesamt, Wiesbaden 2010

* 1. HJ 2009

- 84%
- 89%
Systematization of incentive programs

- big variety of programs to increase energy efficiency in buildings
- systematization of programs based on the 4 central criteria

1. Type of measures which are supported
2. Target groups
3. Type of support
4. Institutional setting
Systematization of incentive programs

- Type of measures which are supported
  - consulting
  - support in construction of new buildings (better performance)
  - energy retrofitting in housing sector

- Target group or addressees
  - individuals
  - industry/business
  - state and public institutions
Systematization of incentive programs

- Type of support
  - loan
  - subsidy
  - guarantee
  - combined types of support

- Institutional backup
  - development banks (e.g., KfW)
  - state institutions
  - energy agencies
  - other institutions
Conclusions

- the holistic approach is necessary
- building certificate is in general seen as a very useful tool for awareness raising, information and data collection
- still many challenges for national implementation

- political willingness and enforcement
- comprehensive legal framework
- tariffs and support programs
- information and education
Conclusions

for energy saving and marketing mechanism preconditions need to be set like

- consumption based billing
- possibility to influence energy consumption

for implementation a staged plan would be recommended

- all buildings: start with new construction (control is important!)
- existing buildings: start with public buildings
Thank you for your attention!

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