



Federal Ministry  
for Economic Affairs  
and Energy

# German Strategy for Energy-Efficient-Buildings & CO<sub>2</sub>-Rehabilitation Programme (operated by KfW on behalf of Federal Ministry for Economic Affairs and Energy, Germany)

Andreas Schüring, Federal Ministry for Economic Affairs and Energy

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Federal Ministry  
for Economic Affairs  
and Energy



Federal Ministry  
of Economics  
and Technology

Federal Ministry for the  
Environment, Nature Conservation  
and Nuclear Safety



## Energy Concept – The Energy Strategy

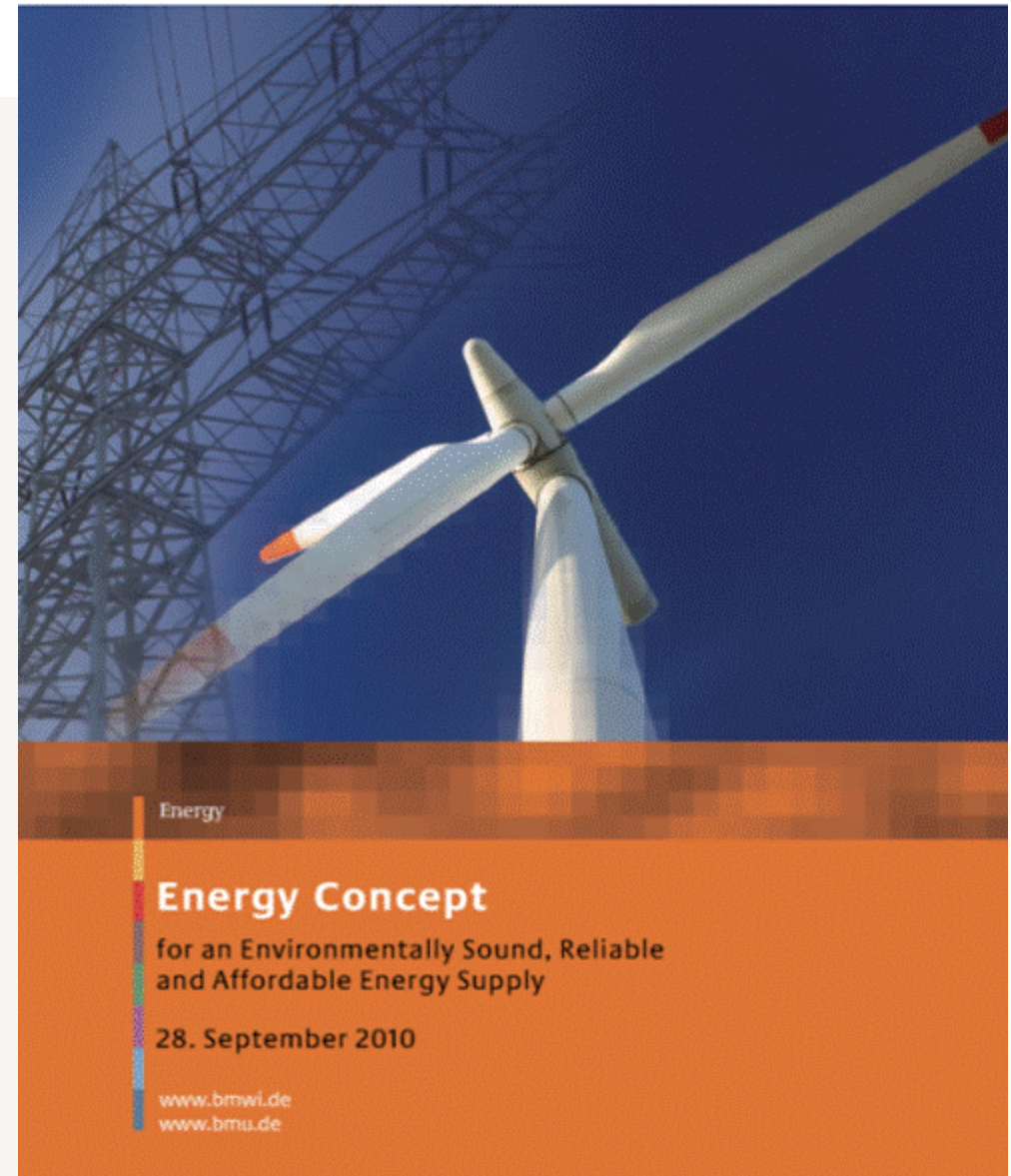
### › By 2020:

- › - **40%** Green House Gas (**GHG**) emissions compared with 1990 levels
- › - **20%** Primary Energy Demand (**PED**) compared with 2008 levels

### › By 2050:

- › - **80%** Green House Gas (**GHG**) emissions compared with 1990 levels
- › - **50%** Primary Energy Demand (**PED**) compared with 2008 levels

### › Balance energy efficiency and renewables





## Energy Concept – Part “Buildings”

- › **By 2020**
  - › **- 20% Heat Demand**
- › **By 2050**
  - › **- 80% PED in buildings**
  - › **existing building stock to be “almost climate neutral” (by reducing heat demand and heating based on renewables)**
- › Improving the quality of energy-efficient measures
- › Technical reality: We are already building in accordance with these highly efficient standards today!

## German Government Coalition Agreement

- › **Continuation and increased funding for the CO<sub>2</sub>-Rehabilitation Programme – KfW Programmes**
- › **Strengthening of Energy Consulting**

### E. Energy upgrades for buildings and energy-efficient new buildings



investments, although in the long run that will save costs. Implementing this strategy will require suitable and reliable legal framework conditions, time and money. That explains the need for a long-term road map for energy upgrades which offers those concerned a framework to guide investment and also the flexibility they need.

The existing instruments will not suffice to meet those targets. The Energy Saving Ordinance (EnEV) specifies requirements for new buildings and for the renovation of existing stock. The Renewable Energies Heat Act (EEWärmeG) was also designed for new buildings. These instruments must be updated to achieve renovation targets, to the extent that this is economically feasible.

However, experience to date also shows that there are limits to the application of government regulations – especially with regard to existing stock – when it comes to the economic strain that owners can be expected to bear. Business as usual, based on the current mix of instruments, will not help us forward. A new strategic approach is needed to take advantage of the technical and commercial opportunities presented by energy upgrades to existing buildings. In future it will be crucial, in the owners' interests, to define the long-term renovation requirement so that owners can take this into account in investment planning. We want to create incentives, not order compulsory renovation. Economic incentives are at the heart of our policy, not telling our citizens what to do. Against this background, the German government will draw up a concept for a long-term road map for building renovations.

#### Energy-efficient buildings by 2050

The core components of this “modernisation campaign” for buildings are as follows:

- The 2012 amendment to the Energy Saving Ordinance will introduce the “climate-neutral building” standard for all new buildings by 2020, based on primary energy indicators. The renovation road map for existing buildings will start in 2020, leading in stages to the target of an 80% reduction in primary energy demand by 2050. The principle of economic viability must be observed in this context.

Buildings account for about 40% of final energy consumption in Germany and about a third of CO<sub>2</sub> emissions. At the same time, there is tremendous potential for saving energy and cutting CO<sub>2</sub>. Three quarters of Germany's existing building stock was built before the first Thermal Insulation Ordinance was adopted in 1979. Many of these buildings have had little or no work performed to upgrade their energy performance. The overwhelming majority of heating systems lag behind the state of the art. The scenarios show that upgrading the building stock's energy performance is the central key to modernising our energy supply and achieving our climate protection targets.

Our central objective is therefore to reduce the heating requirement of our building stock over the long term, and the target for 2050 is to have a building stock which is almost climate-neutral. Climate-neutral means that buildings have very low energy needs, and the remaining energy demand is covered primarily by renewable sources. That means doubling the rate of building renovation to upgrade energy performance from approximately 1% to 2% per annum. By 2020 we want to reduce the heating requirement by 20%. Furthermore, by 2050 we aim to reduce primary energy demand by an order of magnitude of 80%. In 2020 the targets and measures are to be evaluated against the background of the results that have been achieved by then.

Upgrading the energy performance of buildings is the most significant action in sustainably cutting back the use of fossil energy sources and decreasing our dependence on energy imports. This will not come free of charge, but will require considerable



## Key principles for CO<sub>2</sub>-Rehabilitation Programme – KfW-Programmes

### › German Energy Saving Ordinance (EnEV)

- › Promotional programmes are based on legal framework
- › Incentives require higher efficiency standard than legal framework

### › Promotional Programmes are focused on a holistic approach

- › Focusing on energy efficiency and renewable energies
- › Free choice of technology (heating system and building envelope)
- › Cost efficiency and reduction of energy consumption are crucial

### › KfW-Efficiency House: brand for energy-efficiency

- › Technological standard for new and existing buildings
- › Easy to understand: the smaller the number the higher the energy efficiency

### › The higher the energy efficiency, the higher the promotional incentives

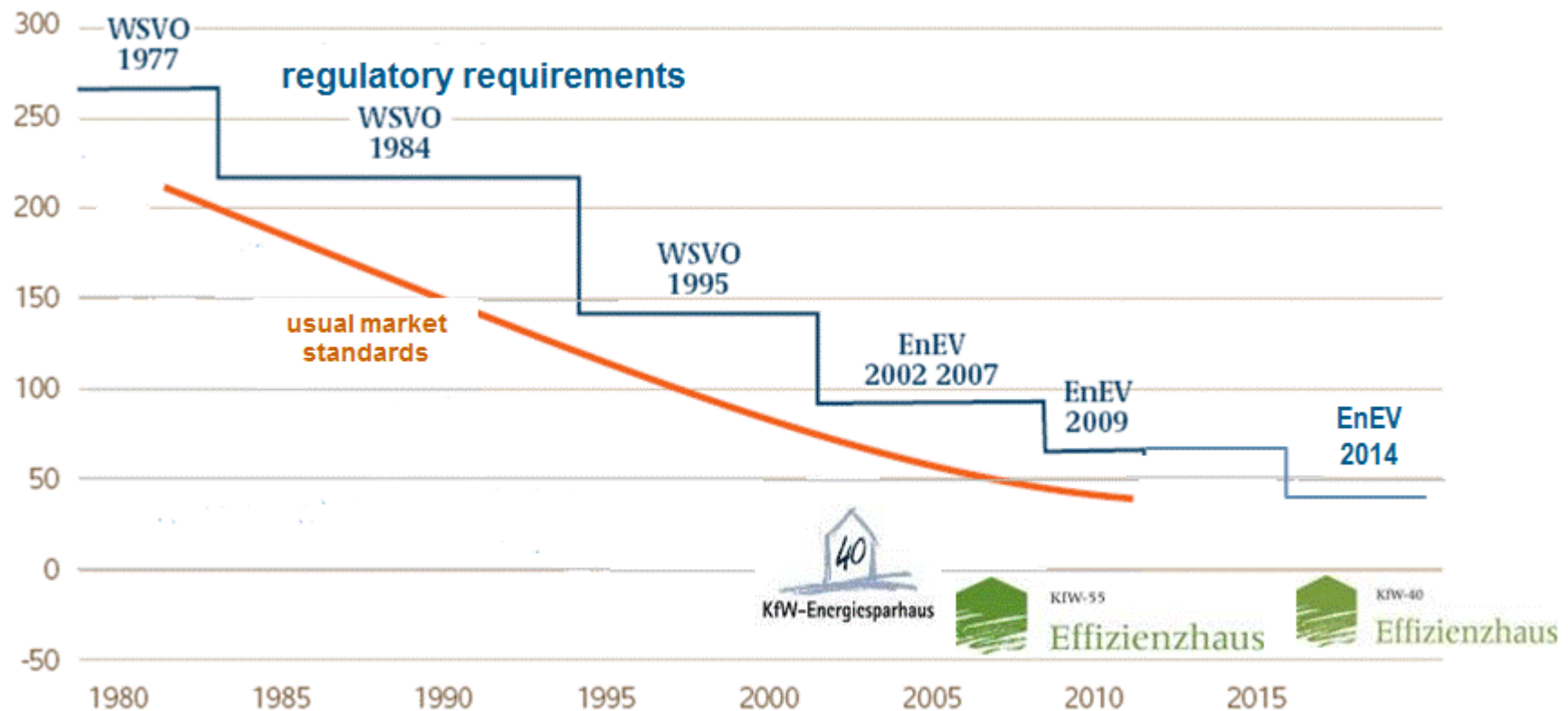






## Development of energy-efficiency standards

Primary Energy Demand (PED) for Heating [kWh/m<sup>2</sup>a] e.g. one-family house



source: KfW / IBP, Erhorn



## German Energy Savings Regulations (EnEV 2009)

- › Energy standards for the construction and the energy-efficient retrofitting of residential and non-residential buildings:
  - › with regard to the envelope
  - › with regard to heating, cooling and air conditioning techniques as well as warm water
- › Determines calculation methods
- › Regulation for Energy Performance certificates

## German Energy Savings Regulations (EnEV 2014)

- › Control system for energy performance certificates
- › Introduction of Low-Energy Building Standard or Zero Energy Building (ZEB) (Art. 9 EPBD)
- › Energy indicator for property advertisements
- › Proportion of renewable energy in energy performance certificates for new build
- › Primary energy indicators for all energy performance certificates



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## KfW-Efficiency House

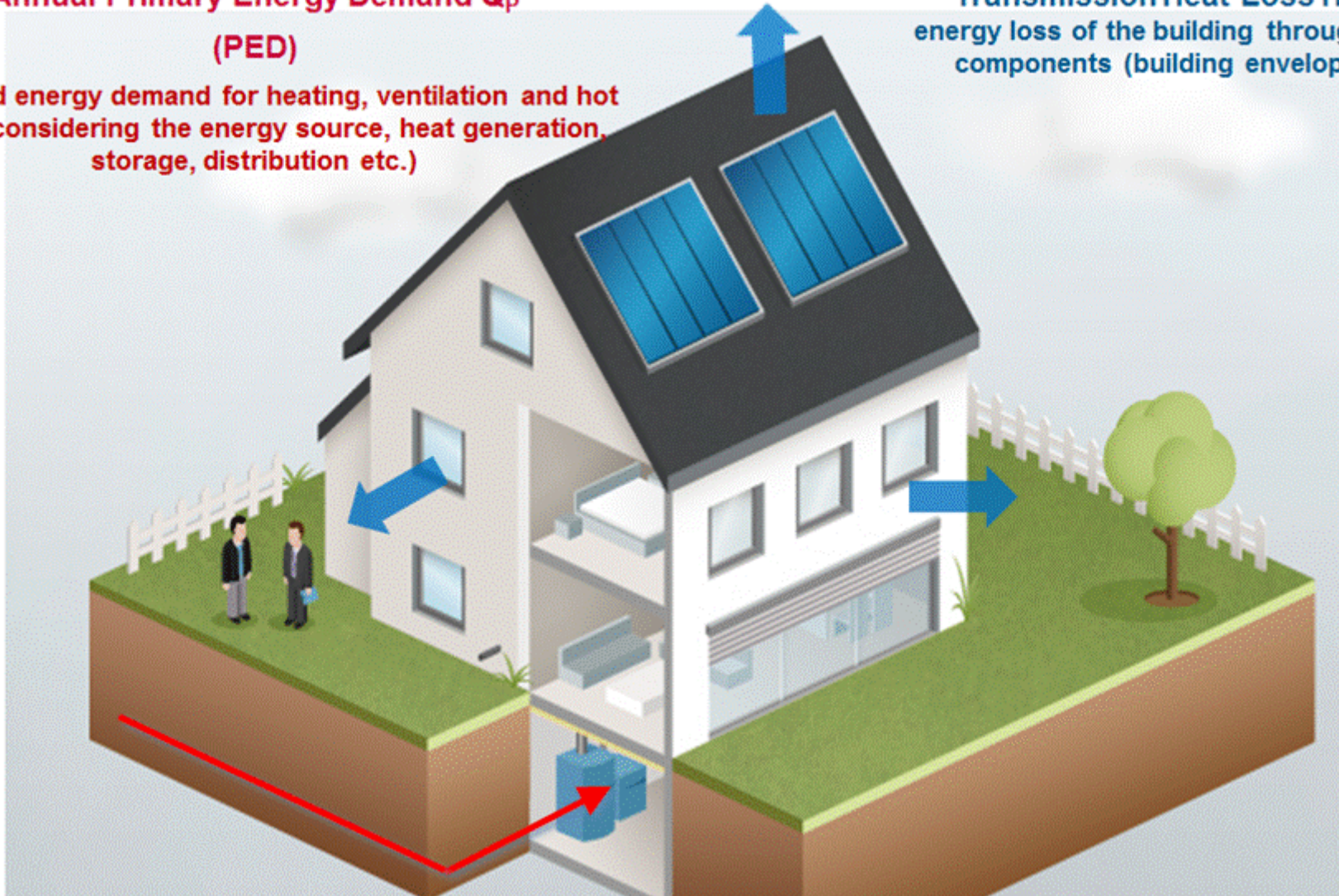
Requirements reduced on two values

**Annual Primary Energy Demand  $Q_p$**

**(PED)**

(required energy demand for heating, ventilation and hot water; considering the energy source, heat generation, storage, distribution etc.)

**Transmission Heat Loss  $H_T$**   
energy loss of the building through its components (building envelope)

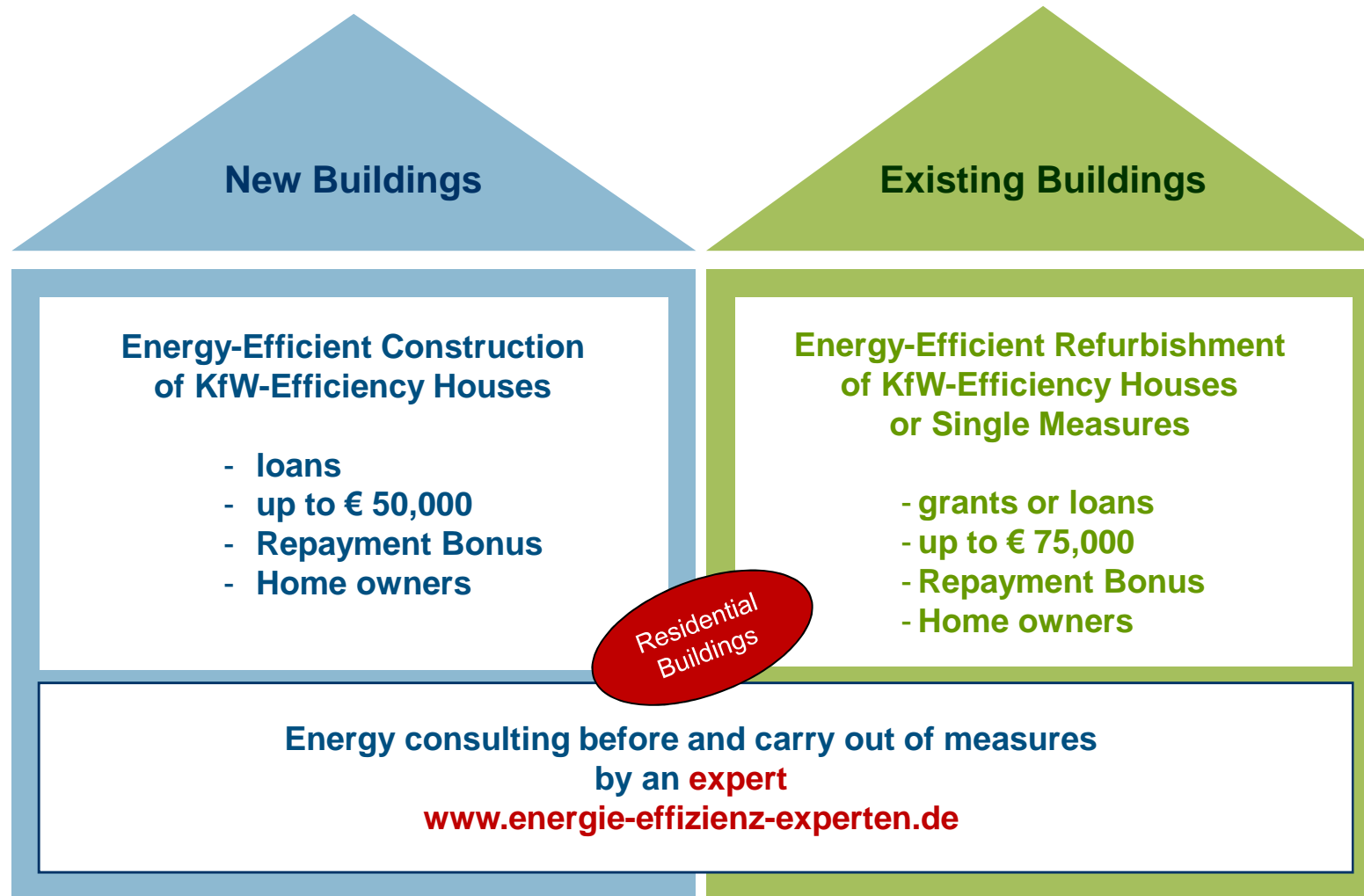




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## CO<sub>2</sub>-Rehabilitation Programme

KfW-Programmes for Residential Buildings and  
Buildings of cities/municipalities and social institutions







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## CO<sub>2</sub>-Rehabilitation Programme

### Energy-Efficient Refurbishment (KfW-Programme)

Residential  
Buildings

#### 2 values (requirements)

#### Loans

or

#### Grants

interest-rate  
1,00 % p.a.\*



Repayment  
Bonus

Annual primary  
energy demand\*\* Transmission-heat-loss\*\*

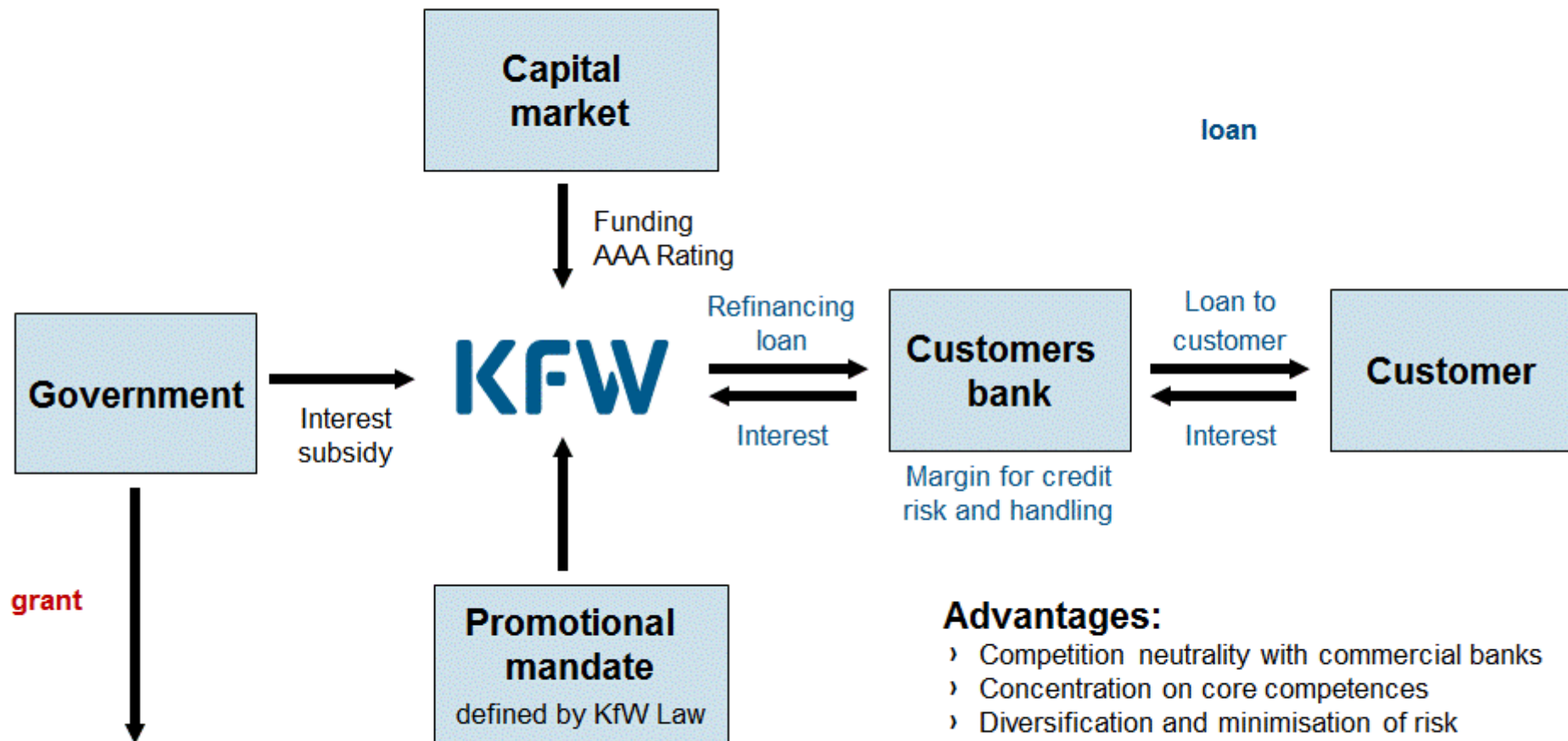
	Annual primary energy demand**	Transmission-heat-loss**	Loans interest-rate 1,00 % p.a.* + Repayment Bonus	Grants
KfW-Efficiency House 55	55 %	70 %	17,5 %	25.0 %
KfW-Efficiency House 70	70 %	85 %	12,5 %	20.0 %
KfW-Efficiency House 85	85 %	100 %	7,5 %	15.0 %
KfW-Efficiency House 100	100 %	115 %	5,0 %	12.5 %
KfW-Efficiency House 115	115 %	130 %	2,5 %	10.0 %
KfW-Efficiency House Monument	160 %	-	2,5 %	10.0 %
Single measure			-	10.0 %

\*\* in % of the reference building of Energy  
Savings Ordinance (EnEV)

\* 06.06.2012 effective interest-rate;| loan amount max. € 75,000 per housing unit for 8  
KfW-EH and max. € 50,000 per housing unit for individual measures



### Refinancing through KfW and on-lending through commercial banks



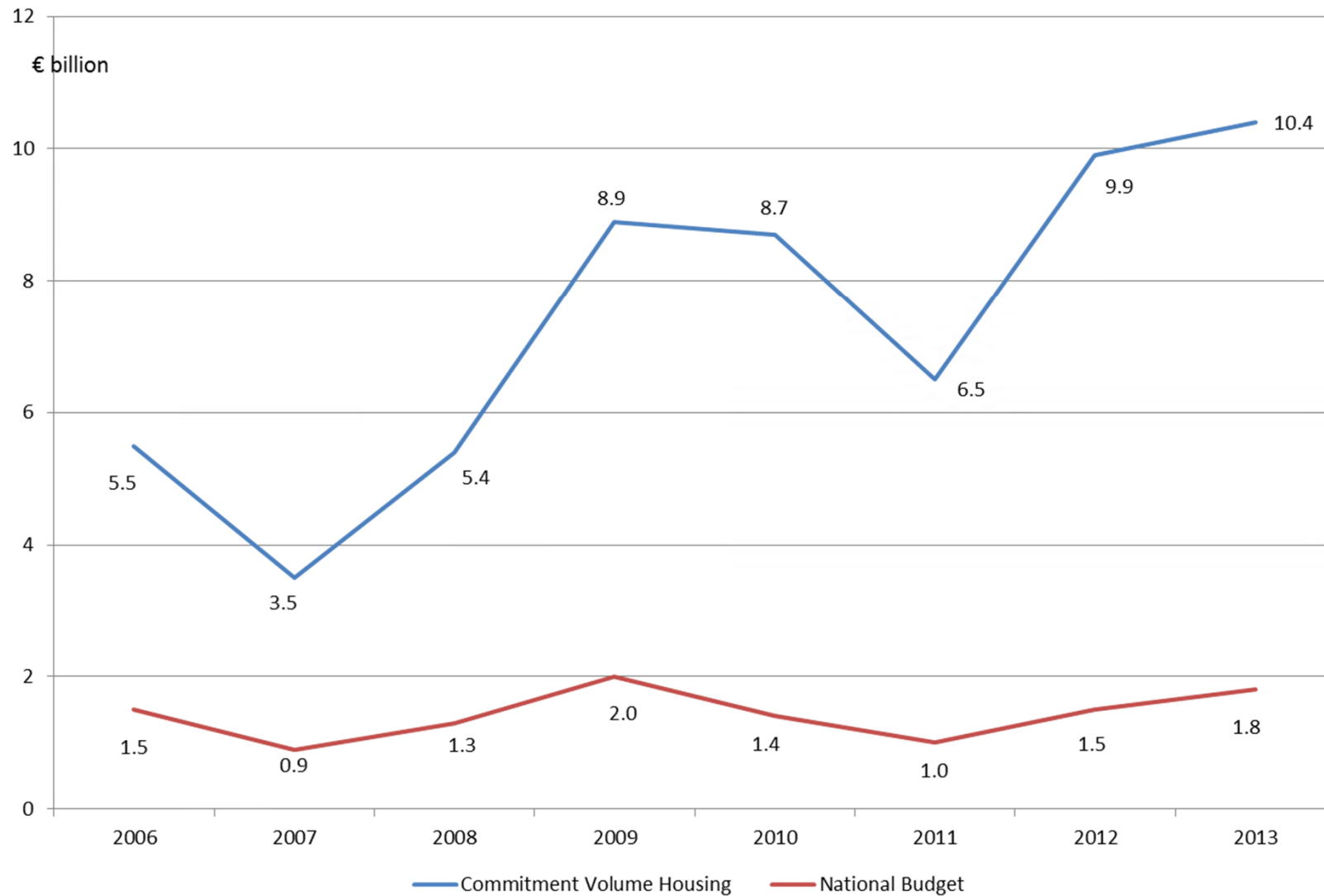
**Grants direct by KfW through customer**



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## CO<sub>2</sub>-Rehabilitation Programme (KfW-Programmes)

Commitment Volumes since 2006





## CO<sub>2</sub>-Rehabilitation Programme (KfW-Programmes)

### Results 2006 – march 2014

- › more than 3.5 million housing units were refurbished or newly erected
- › nearly **50% of new residential buildings** and **33% of refurbished buildings** are cofinanced by CO<sub>2</sub>-rehabilitation programme
- › nearly 1,940 buildings of cities, municipalities and social institutions were cofinanced
- › **€ 11,1 billion federal funds** (2006 – 2013) generated a
  - › **total investment** of around **€ 162 billion**
  - › 1 € public funding effects 12 € private investments in average per year
- › climate will benefit due to **less GHG-emissions of 7.1 mio. t per year** (for an estimated 30 years lifespan of measures)
- › **Energy efficiency benefits all**
  - › saving of heating costs for tenants
  - › tenants live in a more comfortable home
  - › increase of market value of building
  - › Energetic modernisation combined with maintenance measures are often economical
  - › less-dependence on energy





## CO<sub>2</sub>-Rehabilitation Programme (KfW-Pogrammes)

- › investments in energy efficiency create and safeguard annually up to 300,000 jobs in the small and medium-sized construction industry, 2013 up to 440,000 jobs
- › **additional budget** of taxes and social security contribution as well as reducing costs of unemployment (expertise of Forschungszentrum Jülich, Germany) by **reliefs to the public budget** of about **€ 4 to € 5 by each €**
- › energy-efficient refurbishment and erection of „KfW-Efficiency Houses“ demand **further training** of
  - › architects and civil engineers
  - › engineers for heating etc.
  - › energy consultants
  - › skilled employees of construction industry



## Lessons

- › The more transparent and simple the promotional scheme ...
  - › the better it is to understand and
  - › the easier it is to distribute
- › The mandatory involvement of an energy expert is very important to
  - › provide comfort to the investor regarding his energy efficiency project
  - › assure a high degree of quality and reliability regarding energy efficiency level reached
  - › assure target-oriented use of public funds and
  - › assure high degree of reliability regarding the promotional effects
- › Monitoring of promotional effects is important to show
  - › economic and climatic impact
  - › contribution to fulfill the goals of the Federal Government

Bundesministerium für Wirtschaft und Energie (BMWi)  
Federal Ministry for Economic Affairs and Energy  
Referat II C 4 – Förderung von Energieeffizienz im Gebäudebereich (CO2-Gebäudesanierungsprogramm, KfW-  
Programme und Energieberatung)  
Division II C 4 – Promotion of Energy-Efficiency in the Building Sector (CO2-Rehabilitation-Programme – KfW, Energy  
Consultant)  
Andreas Schüring  
Scharnhorststraße 34-37  
D-10115 Berlin  
[Andreas.Schuering@bmwi.bund.de](mailto:Andreas.Schuering@bmwi.bund.de)

[www.bmwi.de](http://www.bmwi.de)