

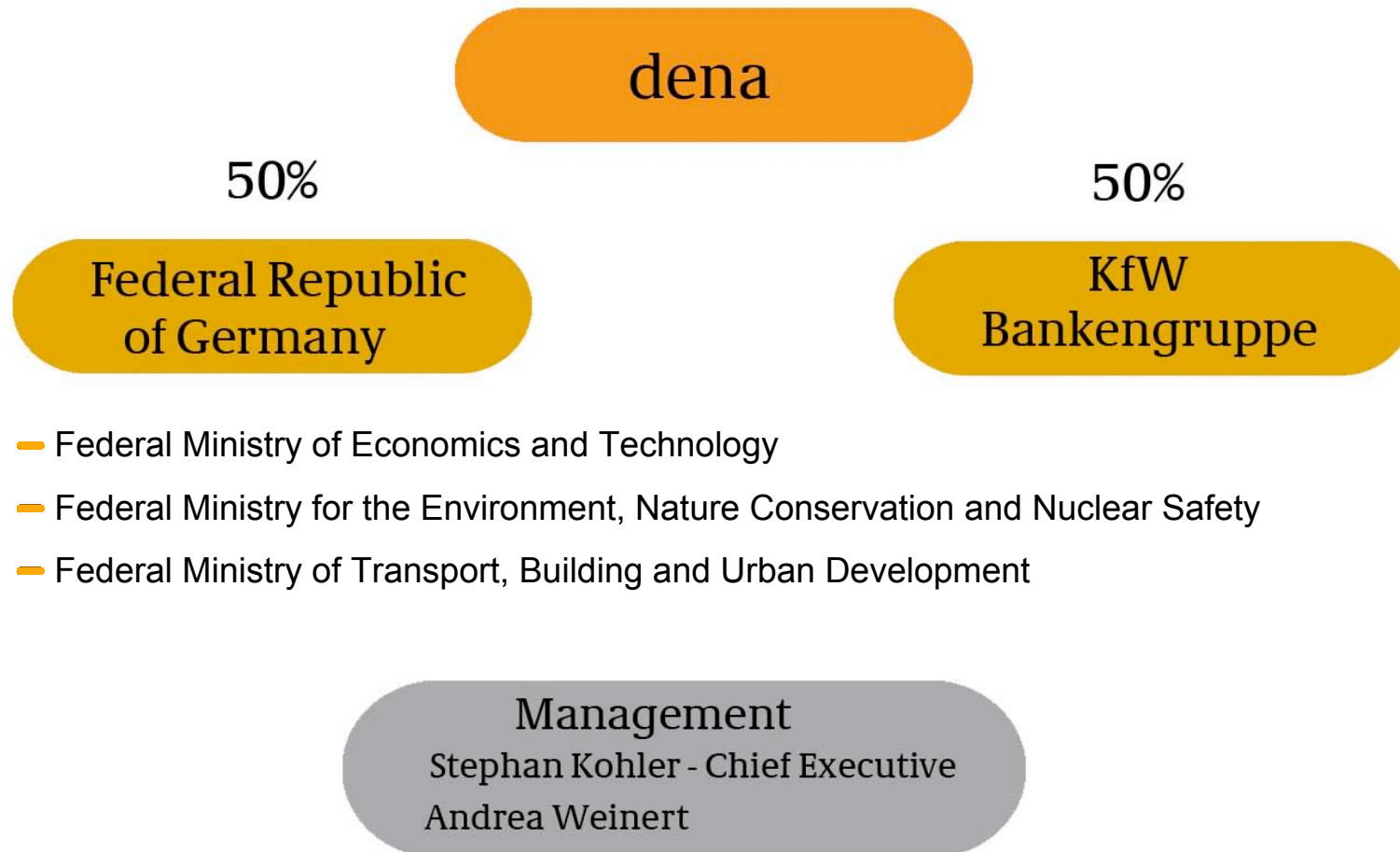
Felicitas Kraus, German Energy Agency

Better than New Buildings –

Best Practices turn into National Standard.

La Colle sur Loup, 7 June 2007

## Ownership Structure of the German Energy Agency.



## dena's board.

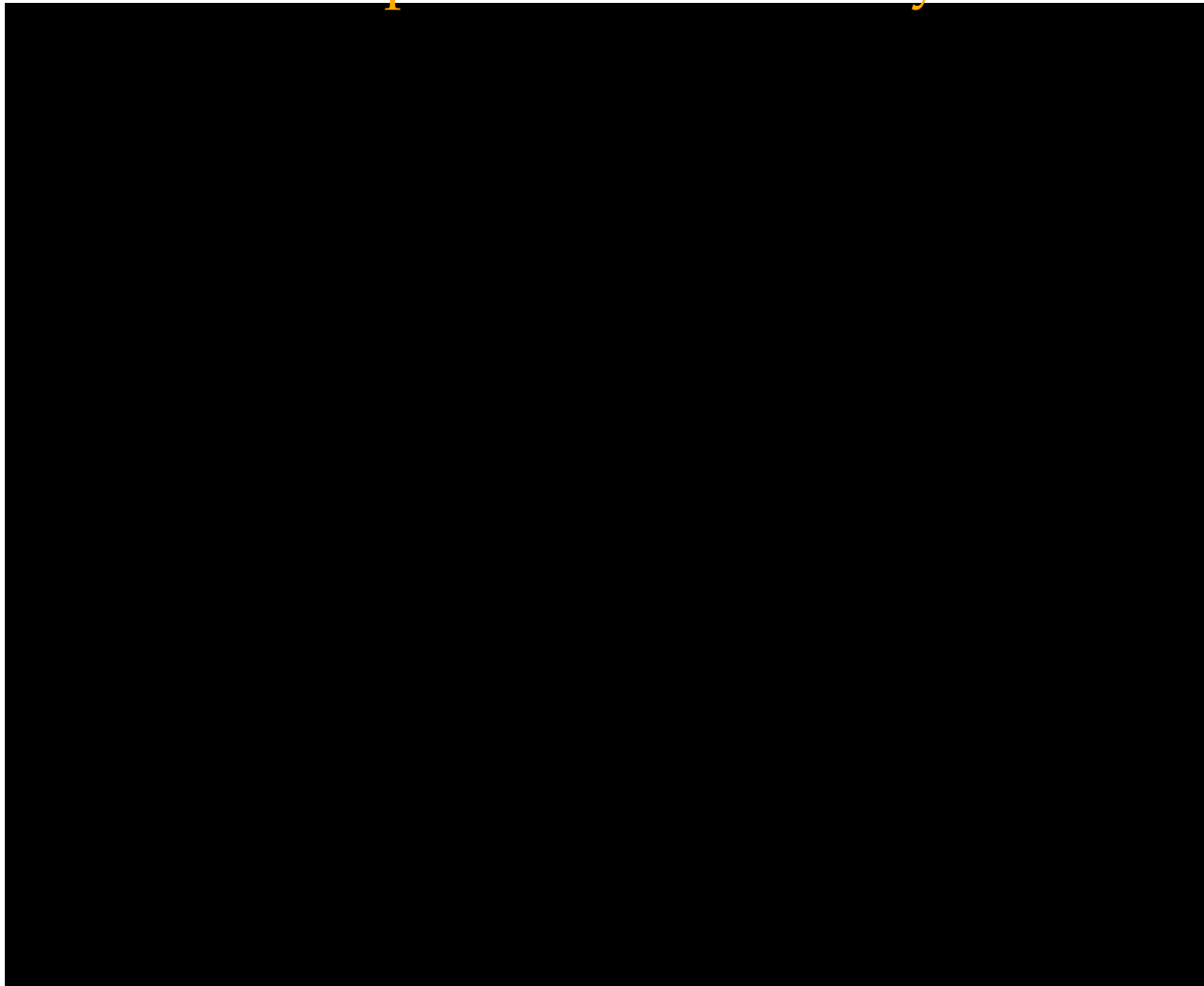
### *Supervisory Board Chairman*

- Michael Glos  
Federal Minister for Economics and Technology

### *Deputy Chairman of dena board*

- Detlef Leinberger  
Managing Director, KfW Bankengruppe
- Dr. Tessen von Heydebreck  
Member of the Group Board of Deutsche Bank AG
- Wolfgang Kroh  
Managing Director, KfW Bankengruppe (Deputy Chair)
- Wolfgang Tiefensee  
Federal Minister for Transport, Building and Urban Development
- Sigmar Gabriel  
Federal Minister for the Environment, Nature Conservancy and Nuclear Safety

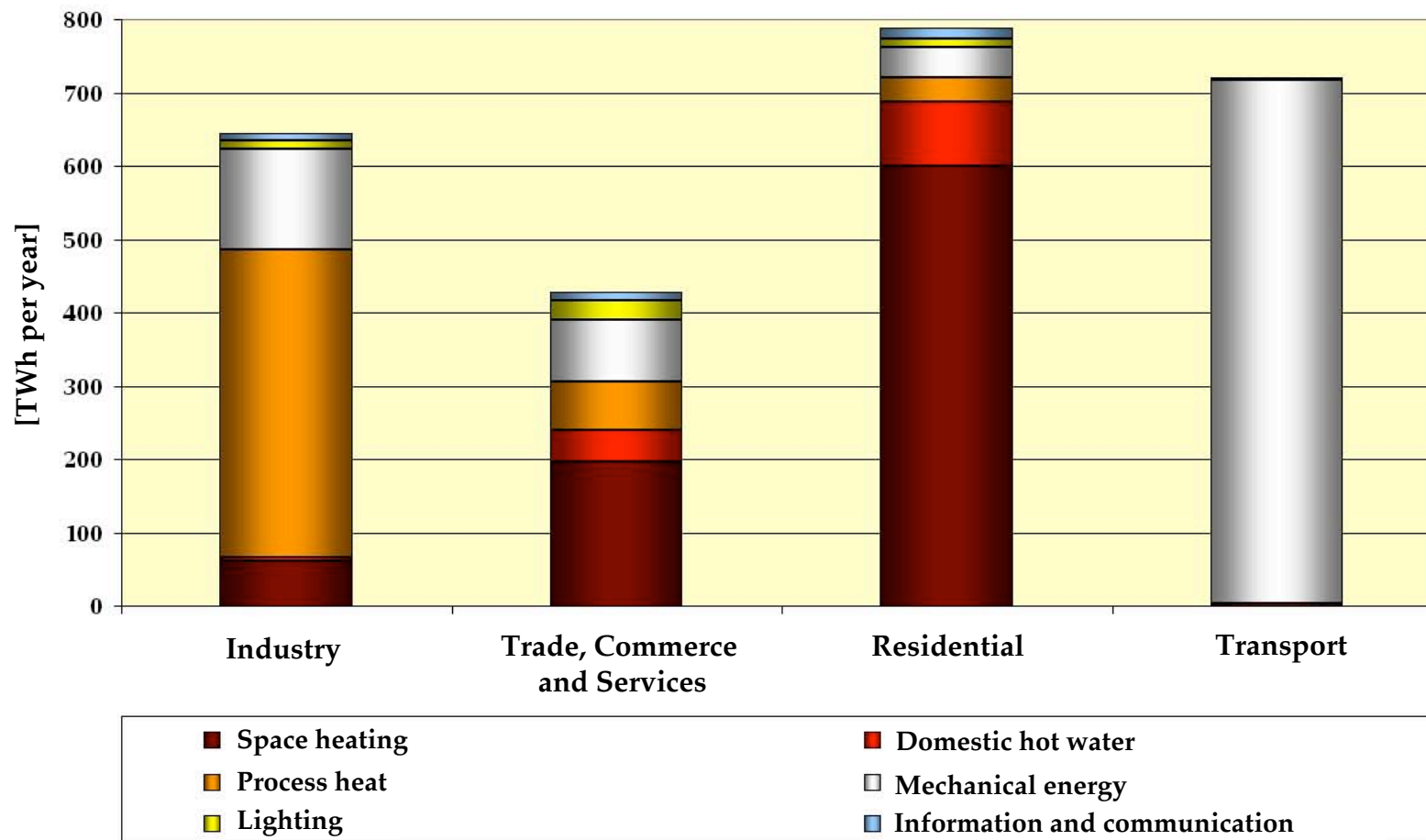
## Fields of Competence and Activity at dena.



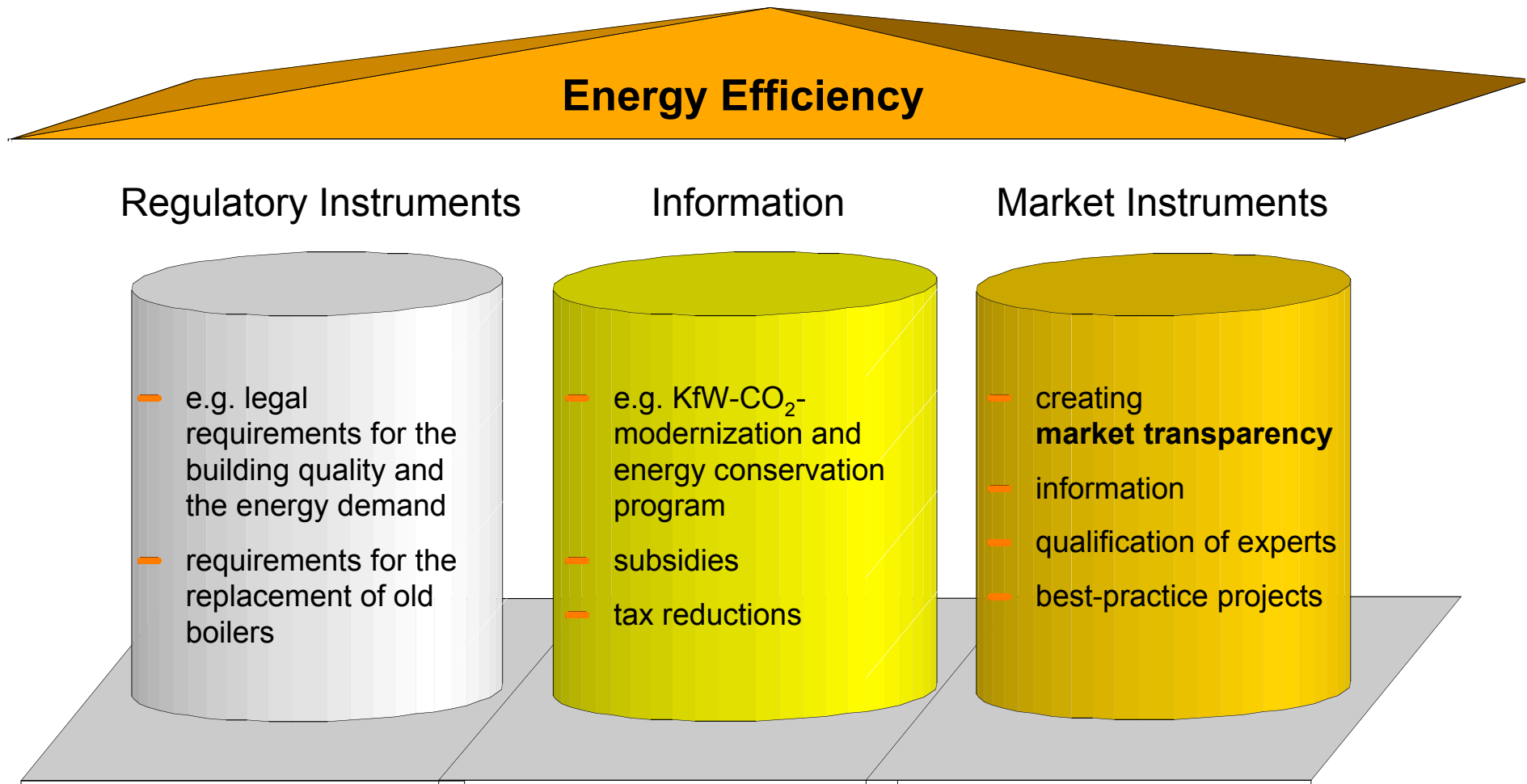


## „EfficientHomes“ – Motivation & Objectives.

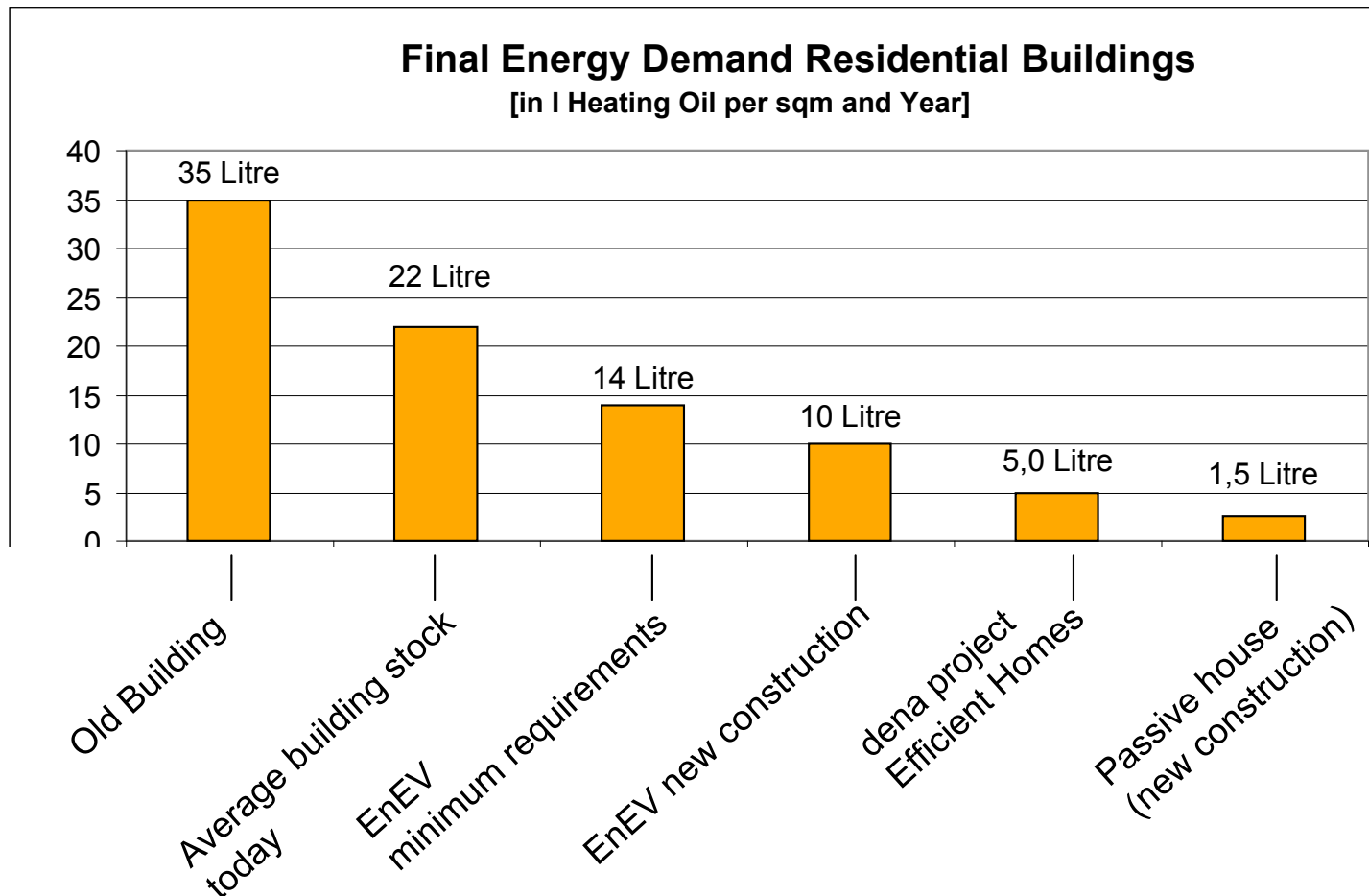
## Structure of the Final Energy Consumption in Germany according to Sectors and Usage (2003).



## Political Instruments for Energy Efficiency.



## Comparing Different Building-Standards.





## Actions of the Federal Government (Coalition Contract)

- Increasing the CO<sub>2</sub>-building renovation program from annually 360 million € to 1,4 billion €
  - low-interest loans (partly with repayment subsidies)
  - subsidies
  - Also energy efficient renovation of Federal Buildings, schools and nursery schools
- renovation of about 5% of the existing buildings erected before 1978
  - equivalent to 1,4 million units per year
  - comparison 2005: renovation of 76.000 units within the CO<sub>2</sub>-building renovation program

## „EfficientHomes“ - Objectives and Strategies.

Project partner:



Bundesministerium  
für Verkehr, Bau  
und Stadtentwicklung

**BASF**  
The Chemical Company

**BGW**

- Testing and launching of highly innovative energy standards concerning the building stock (“efficiency standard” and “future standard”) together with strong market partners
- Presenting economic advantages for the housing industry
- Generation of long-lasting regional multiplier effects by the creation of competence networks
- Know-how transfer and qualification



## „EfficientHomes“ – Motor for Innovations.

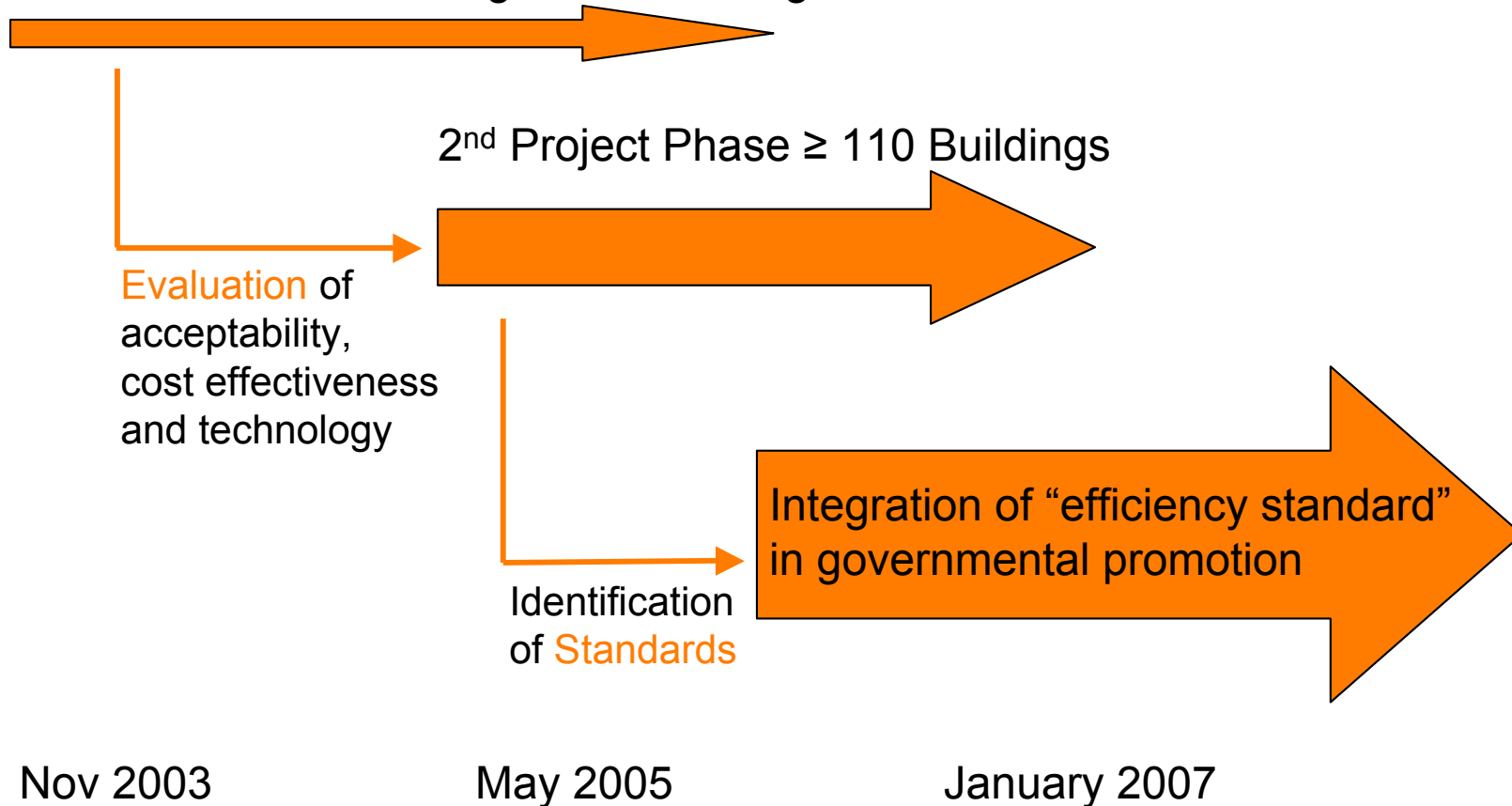
- Pre-Conditions for increased energy efficiency in the building sector:
  - Fast and widespread launch of modern energy efficiency technologies
  - At the same time high innovation rate
- Problem: Launch of innovative technologies in building sector rather low duration of several years despite high readiness for market of a lot of technologies.
- Strategy of „EfficientHomes“:
  - Development of highly innovative energy standards for the building stock
  - Presenting possibilities for the application of already existing technologies
  - Indication of technical and organizational progress, e.g. further development of the energy measures of for the building shell like VIPs
  - Findings are influencing governmental standards and financial promotion



## Energy Standards.

## Project Structure: „Efficient Homes“.

Pilot Phase = 33 Buildings /500 dwelling units

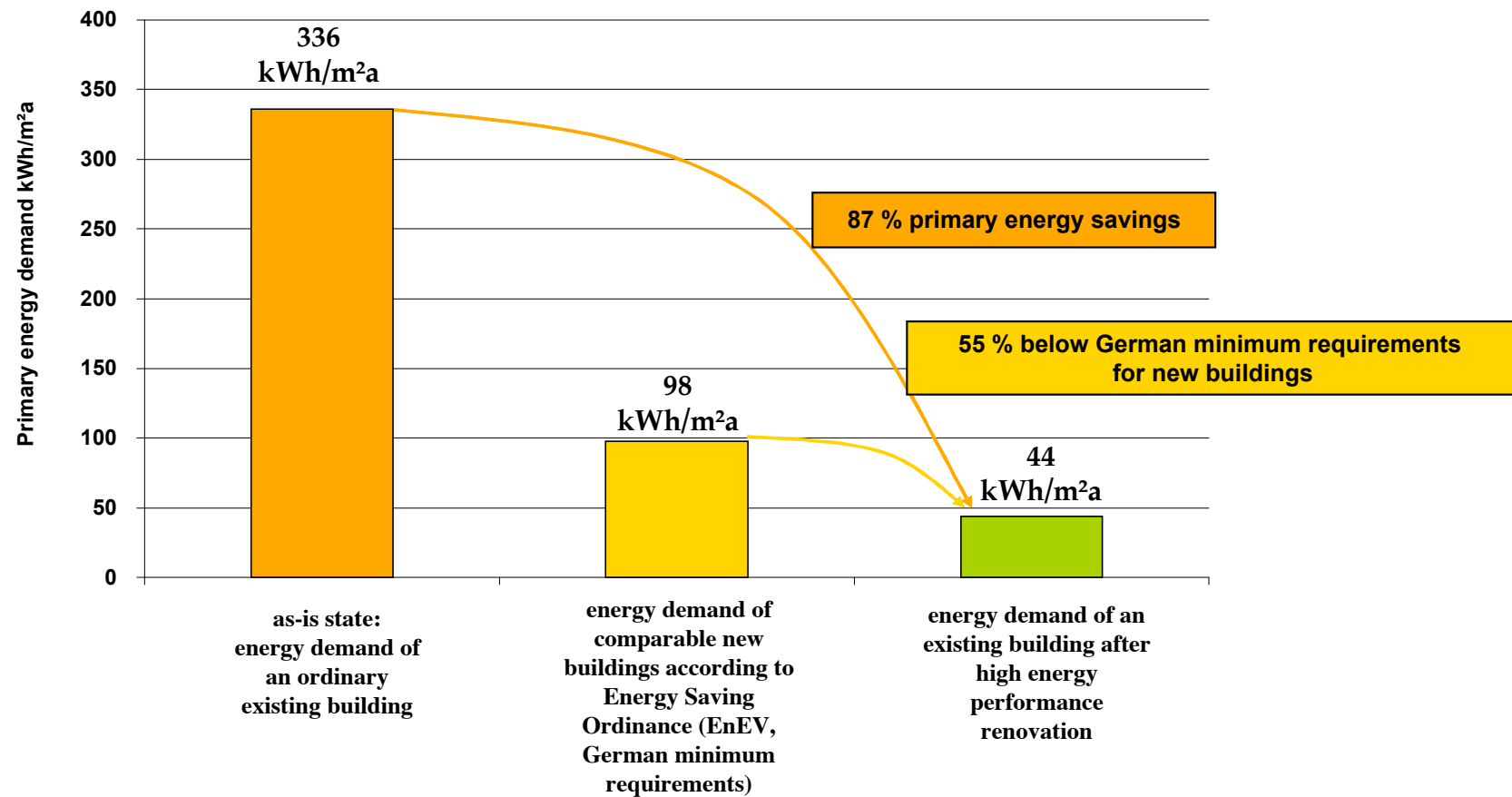


## „EfficientHomes“.

- 143 Buildings
- Multi-family buildings and Single and two-family homes.
- Wide variety with respect to years of construction (listed buildings, 50s – 70s)
- all over Germany



## Energy Saving by High Energy Performance Renovation.



## Standards Compared to Minimum Requirements for New Buildings.

<b>Standard</b>	<b>Primary energy demand (kWh/m2a)</b>	<b>Final energy demand (kWh/m2a)</b>	<b>Specific transmission heat loss (W/m2a)</b>
EnEV-NB-30% Low-interest loan with payback subsidy 12,5 %	minus 30 %	-	minus 30 %
EnEV-NB-50% Low-interest loan with payback subsidy 20 %	minus 50 %	minus 40 % of min. req. primary energy NB	minus 50 %

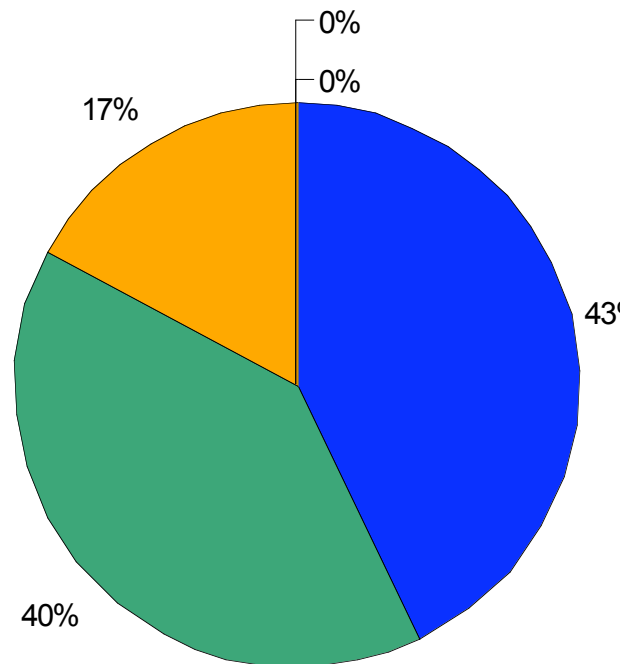


## Possibilities how to Reach the Low-Energy-Standard.

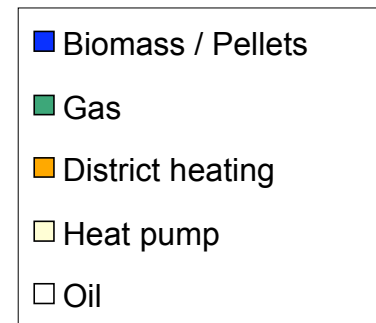
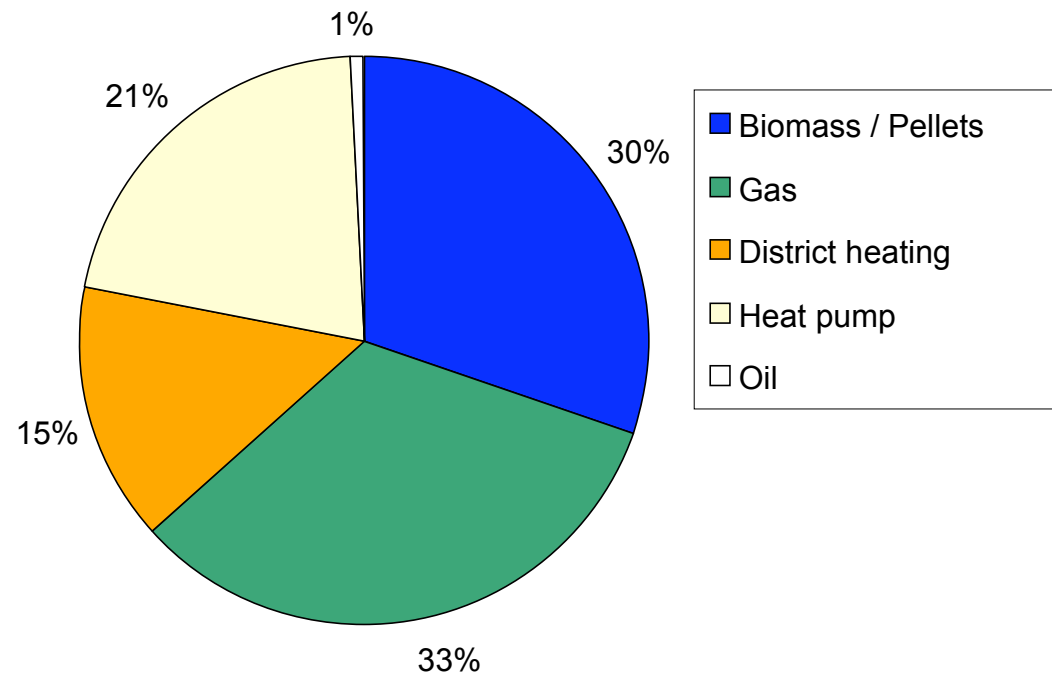
Component	before refurbishment	measures taken	after refurbishment
exterior walls	1,27 W/(m <sup>2</sup> K)	15-30 cm insulation	0,20 W/(m <sup>2</sup> K)
roof	0,97 W/(m <sup>2</sup> K)	20-40 cm insulation	0,17 W/(m <sup>2</sup> K)
basement ceiling	1,19 W/(m <sup>2</sup> K)	10 cm insulation	0,28 W/(m <sup>2</sup> K)
thermal bridges	0,10 W/(m <sup>2</sup> <sub>surface area</sub> K)	standard measures	0,05 W/(m <sup>2</sup> <sub>surface area</sub> K)
windows	3,20 W/(m <sup>2</sup> K)	two-pane-heat-insulating glazing, conventional windows	1,1 W/(m <sup>2</sup> K)
ventilation	natural ventilation	ventilation with heat recovery	system efficiency > 80 %
heating systems	steady temperature boiler	new boiler, regulated pumps	condensing boiler

## Heat-Systems in the Pilot-Projects

1. Project Phase (MFD)

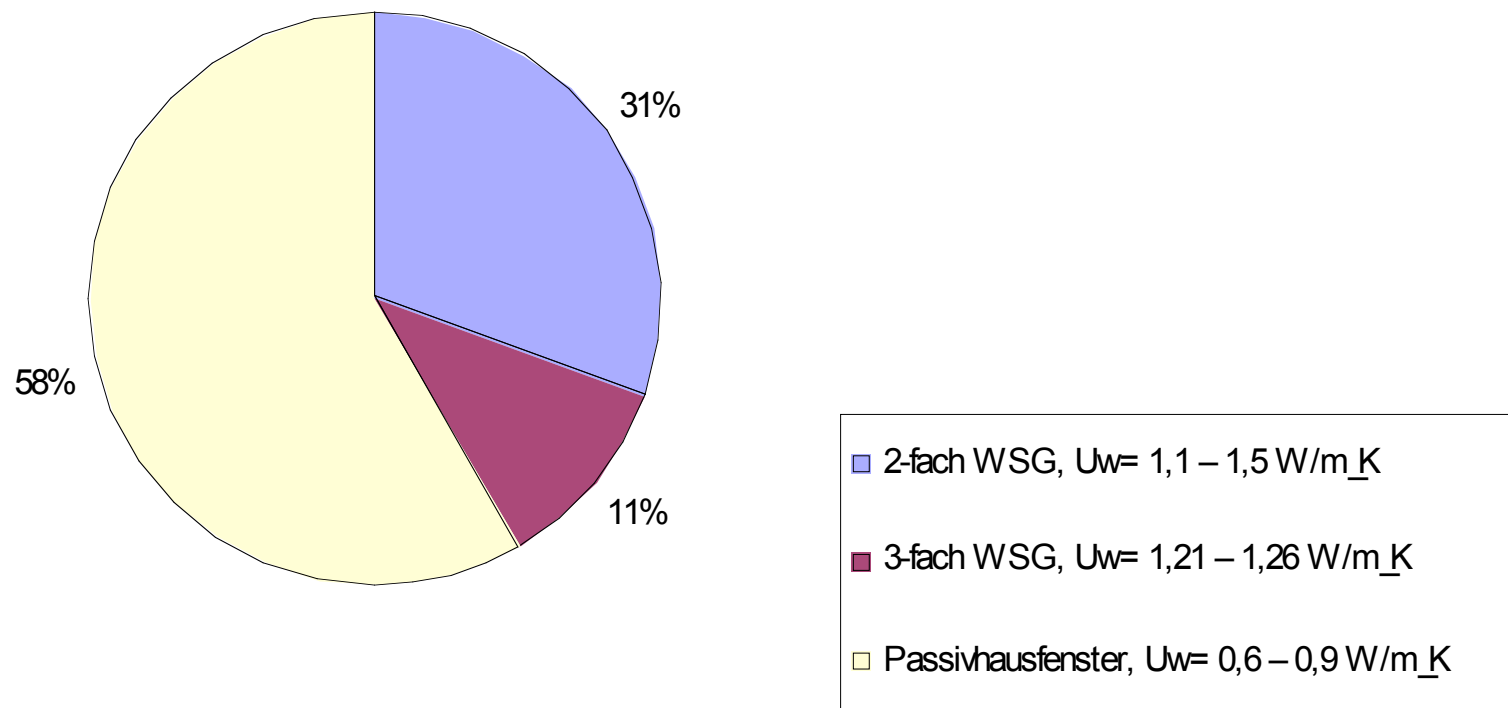


2. Project Phase (all building types)

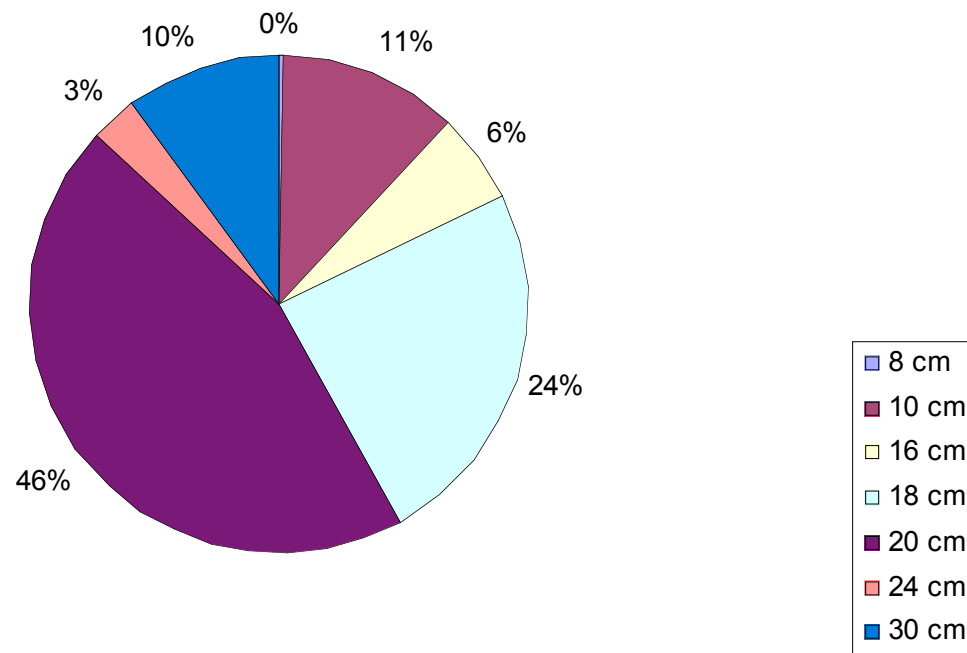


50% of the buildings  
additionally use solar energy

## „EfficientHomes“: applied Window Qualities.

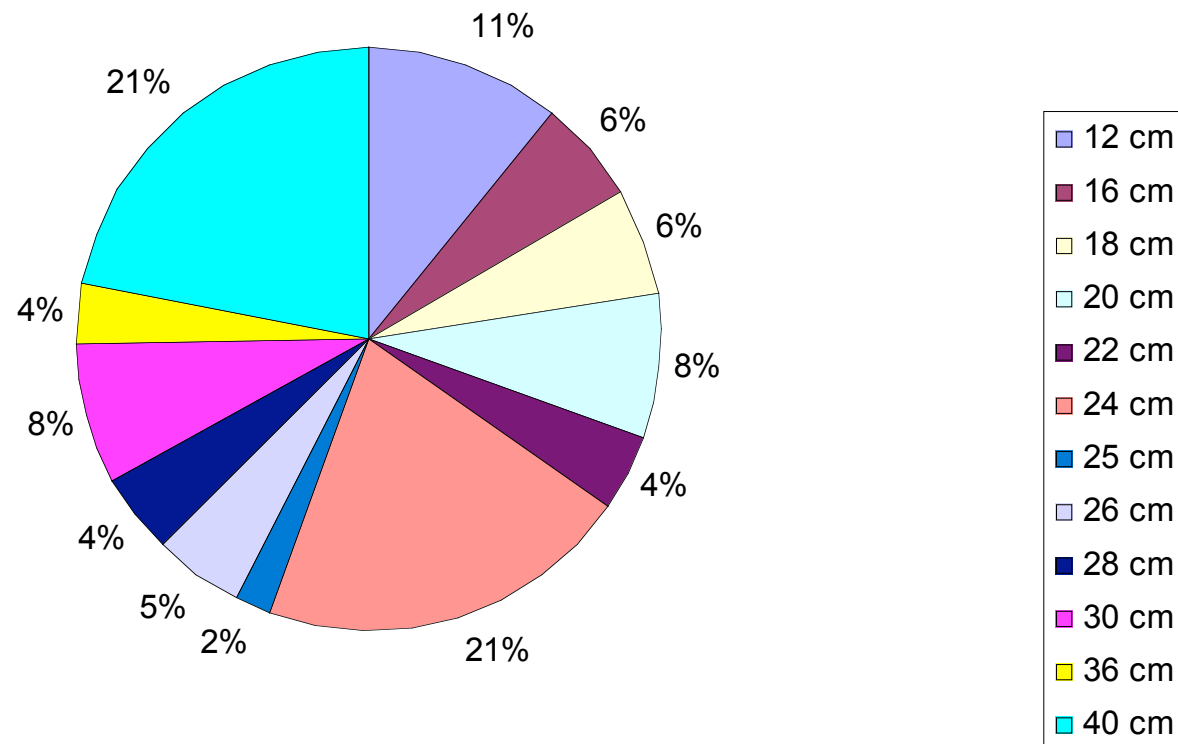


## „EfficientHomes“: Thickness Outside Wall Insulation.



— Average thickness of outside wall insulation: 19 cm

## „EfficientHomes“: Thickness Roof Insulation.



— Average thickness of roof insulation: 26 cm

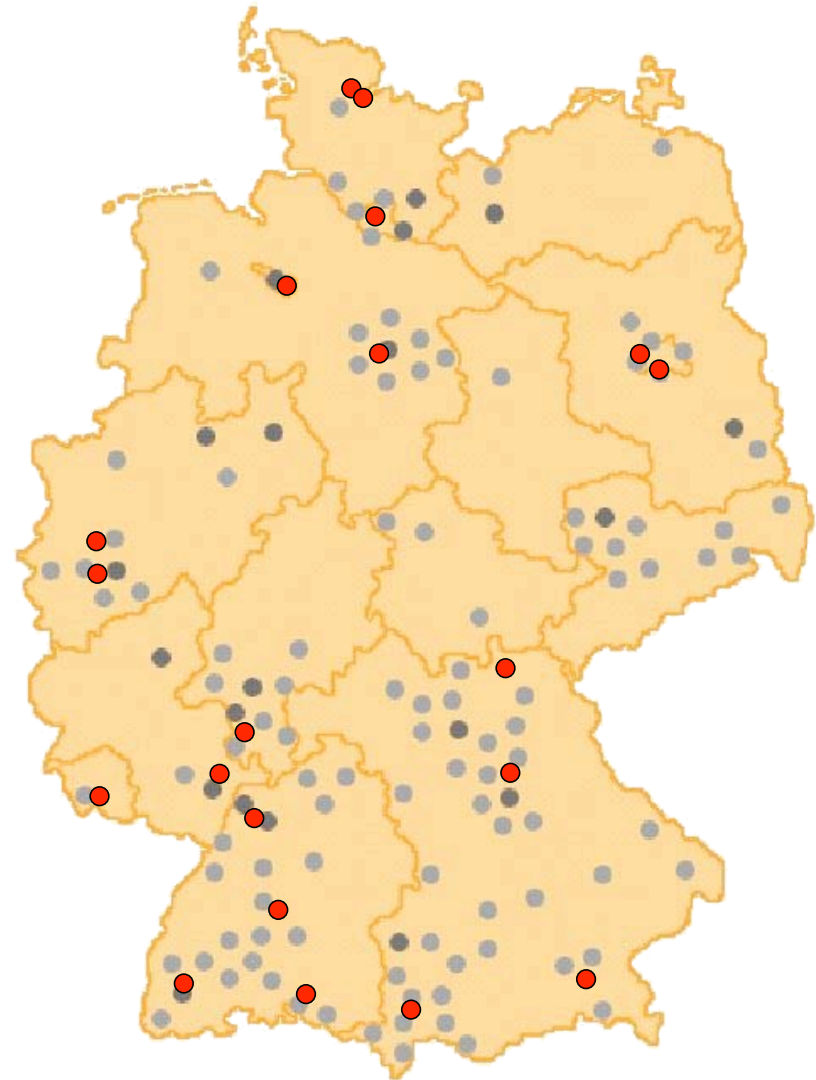


Qualification.

## Best-Practices On-Site: Centres of Excellence.

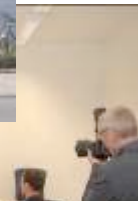
### 25 regional competence centres ● :

- most of them regional energy agencies
- regional multipliers
- know-how transfer
- advanced training for architects and engineers
- consulting of owners and constructors
- regional PR



## dena-Dialog regional.

- 30 Workshops all over Germany (16 per year)
- each with specific topic:
  - building envelope and architecture
  - air conditioning
  - renewable energy
  - economical aspects
- especially for experts:
  - Architects
  - Planners
  - Engineers
- more than 4.500 participants







Role Model Function of „EfficientHomes“.

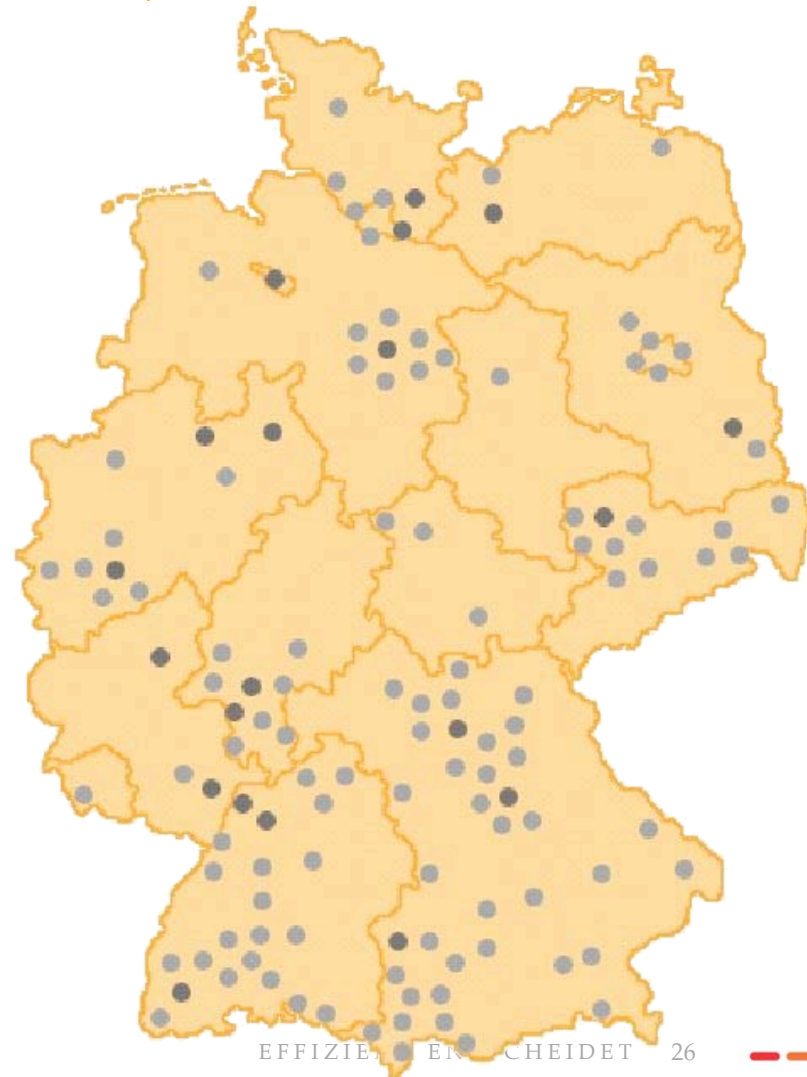
## Development EnEV-NB minus 30%.

- 2005 – 2006  
part of “EfficientHomes”:

110 Buildings

- Since 2007  
governmental promotion

**702** Buildings  
(January – Mai)



## Interactive CD-rom for End-Consumers

- Especially made for end-consumers to inform about high energy performance modernisation
  - Movies
  - Documents
  - Graphics



## Public-Awareness: Open Day of High Energy Performance Buildings 16<sup>th</sup> June 2007.

- Introduced by local and national PR
- All participating renovation objects can open their doors to the public,
- Town festivals in selected cities with a lot of attractions (information, painting competition for kids, catering, etc.) for families and general public in city centres
- Information about the high energy performance buildings in general and especially about the building of the city participating in Efficient Homes
- Guided tours through “Efficient Homes” for those who wish to see and experience a high energy performance building themselves



## The largest „EfficientHome“

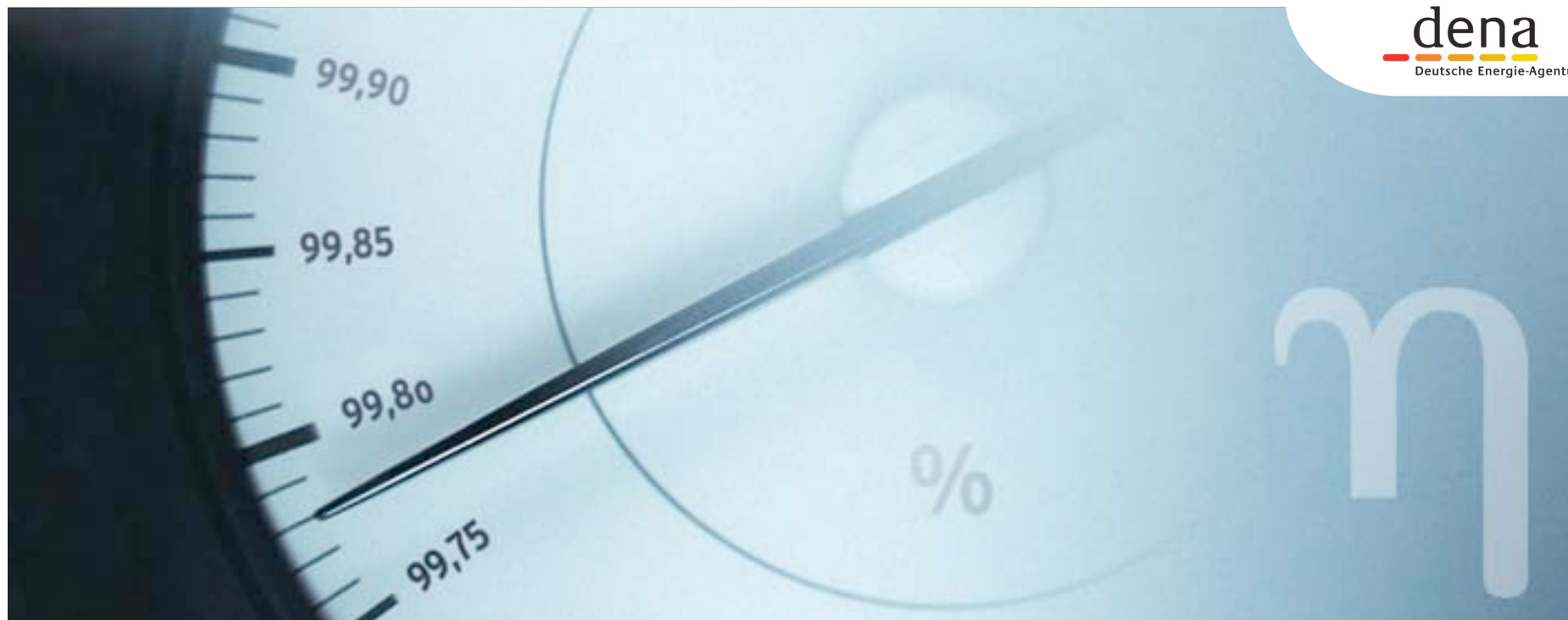


- Year of construction      1974
- End of modernisation    August 2006
- 18.000 m<sup>2</sup>
- 295 dwelling units
- double skyscraper“ with 16 / 22 floors
- Primary energy demand  
after modernisation      45 kWh/m<sup>2</sup>a  
  -> savings                      50 %
- Min. requ. comp. NB      67,9 kWh/m<sup>2</sup>a

## „EfficientHome“ in Bedburg.



- Year of construction 1958
- End of modernisation July 2006
- 205 m<sup>2</sup>
- 1 dwelling units
- Primary energy demand after modernisation 23 kWh/m<sup>2</sup>a  
—> savings 78 %
- Min. requ. comp. NB 105 kWh/m<sup>2</sup>a



Efficiency decides.