

Energy Conservation - Scientific Assessment of Projects

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Evaluation, Training and Education

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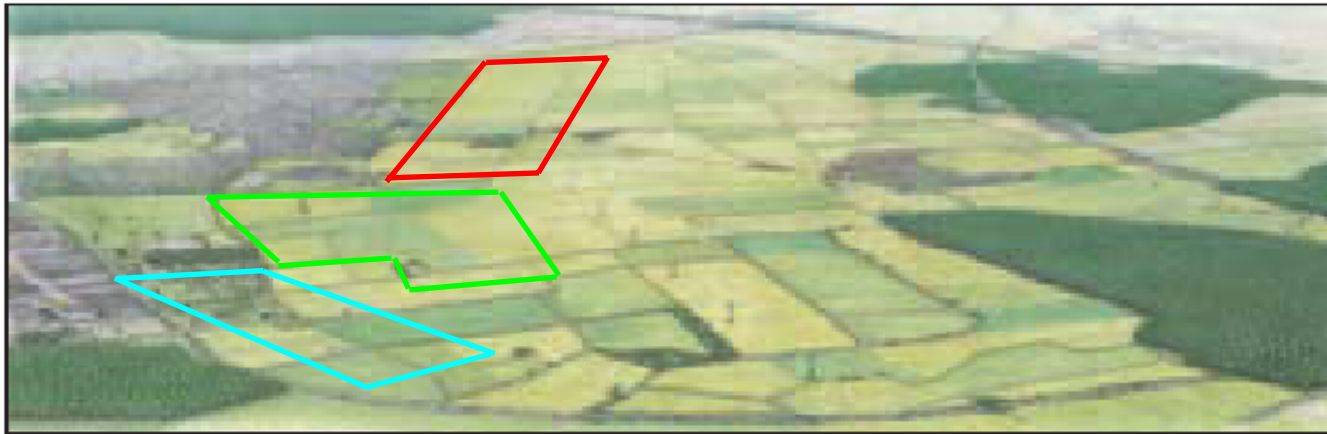




SUMMARY

- TECHNICAL IMPLEMENTATION
(Pilot Project Hannover Kronsberg)
- EVALUATION OF EXPO 2000
ENERGY CONSERVATION PROJECT
- AUDIT OF ENERGY CONSERVATION
IN GERMAN BUILDINGS
- TRAINING PROGRAMMES AND
PUBLIC EDUCATION PROGRAMMES

Hannover Kronsberg: The new Vision of Sustainable Development



1980

Kronsberg c. 1980: late 20th-century industrial agriculture with settlement margins and the village of Wülferode



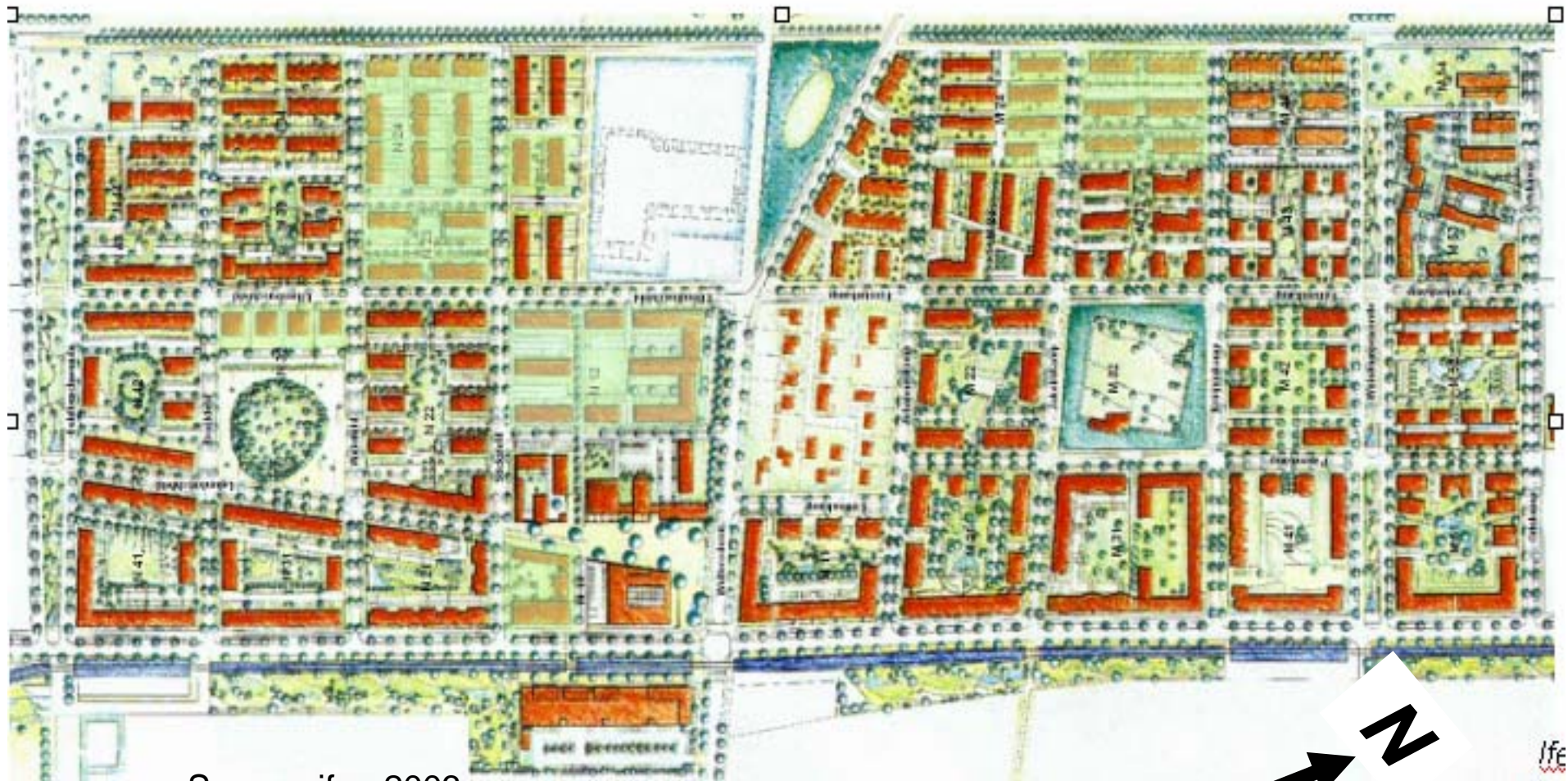
2050

Kronsberg c. 2050: vision of sustainable landscape and residential development

Source: Hannover Kronsberg Handbook

Key Data of Kronsberg

2890 apartments 6475 inhabitants 213000 m² living area



Source: ifeu 2003

Typical Structure: Multifamily Housing

Source: Hannover Kronsberg Handbook



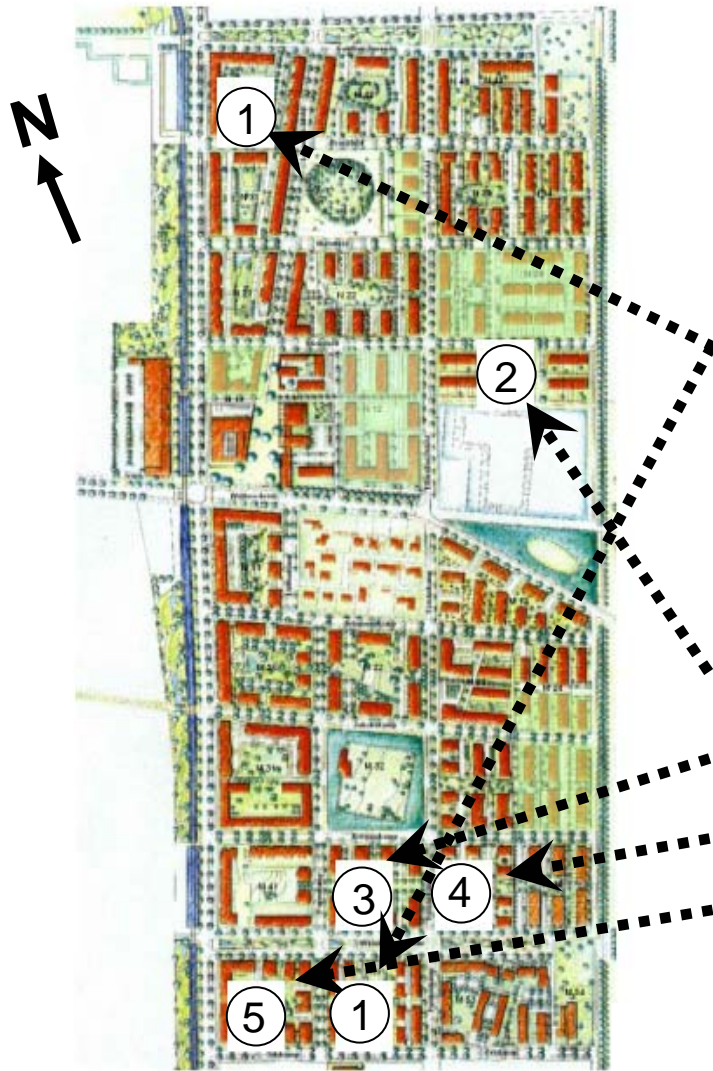
<http://www.hannover.de/>

http://www.sibart.org/pdf/handbook_big_en.pdf

Ecological Optimization at Kronsberg

- Soil management
- Waste management
- Water concept
- Communications networking
- Public relation
- **Energy concept (main focus)**

Energy Concept of Kronsberg



**Basic principles for all areas:
low energy houses
and district heating from
CHP stations**

1) energy plants (CHP)

**plus innovative projects
for some areas:**

2) passive houses

3) atrium elements

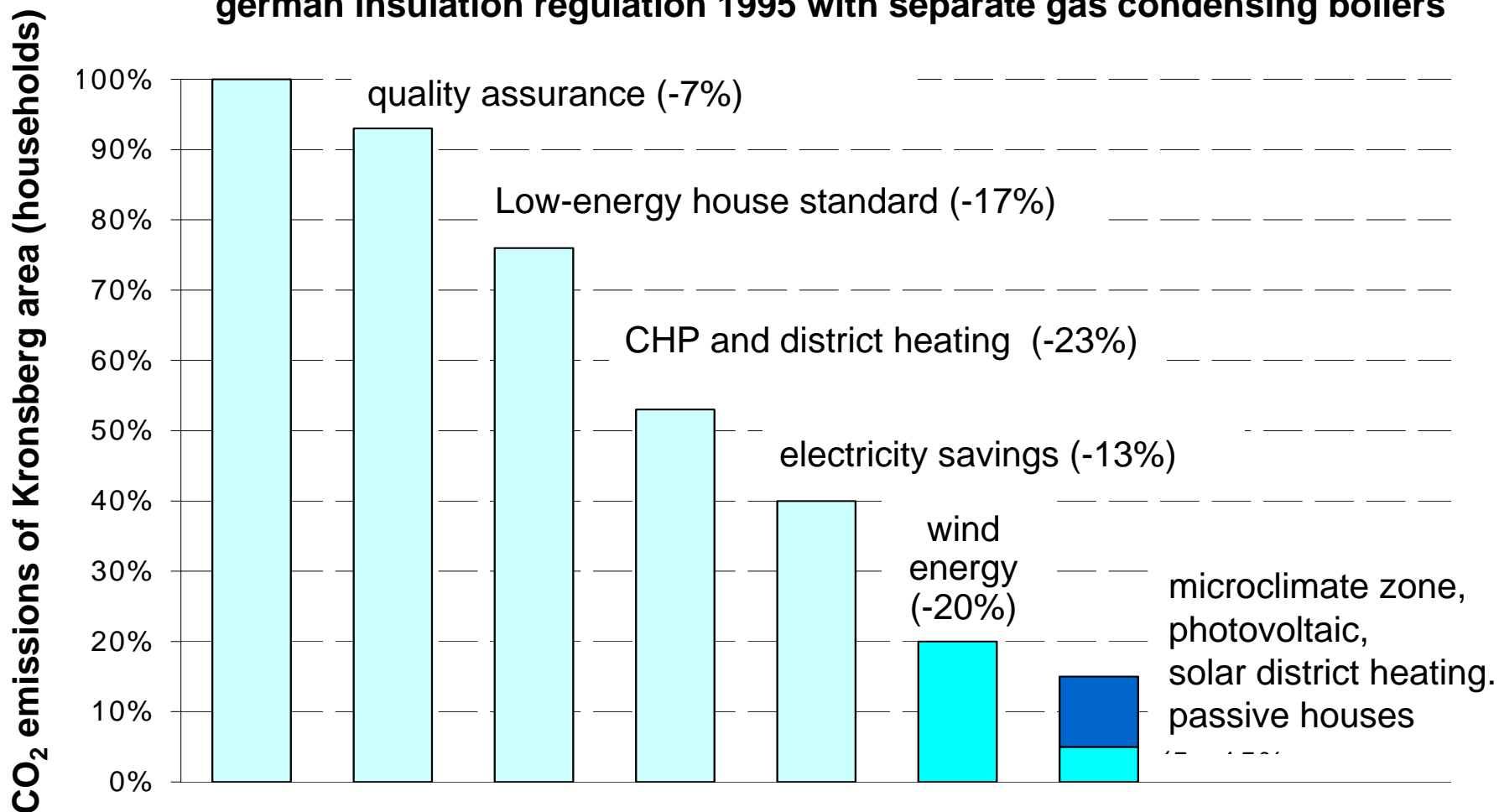
4) solar heating

5) photovoltaic installations

6) wind turbine generators

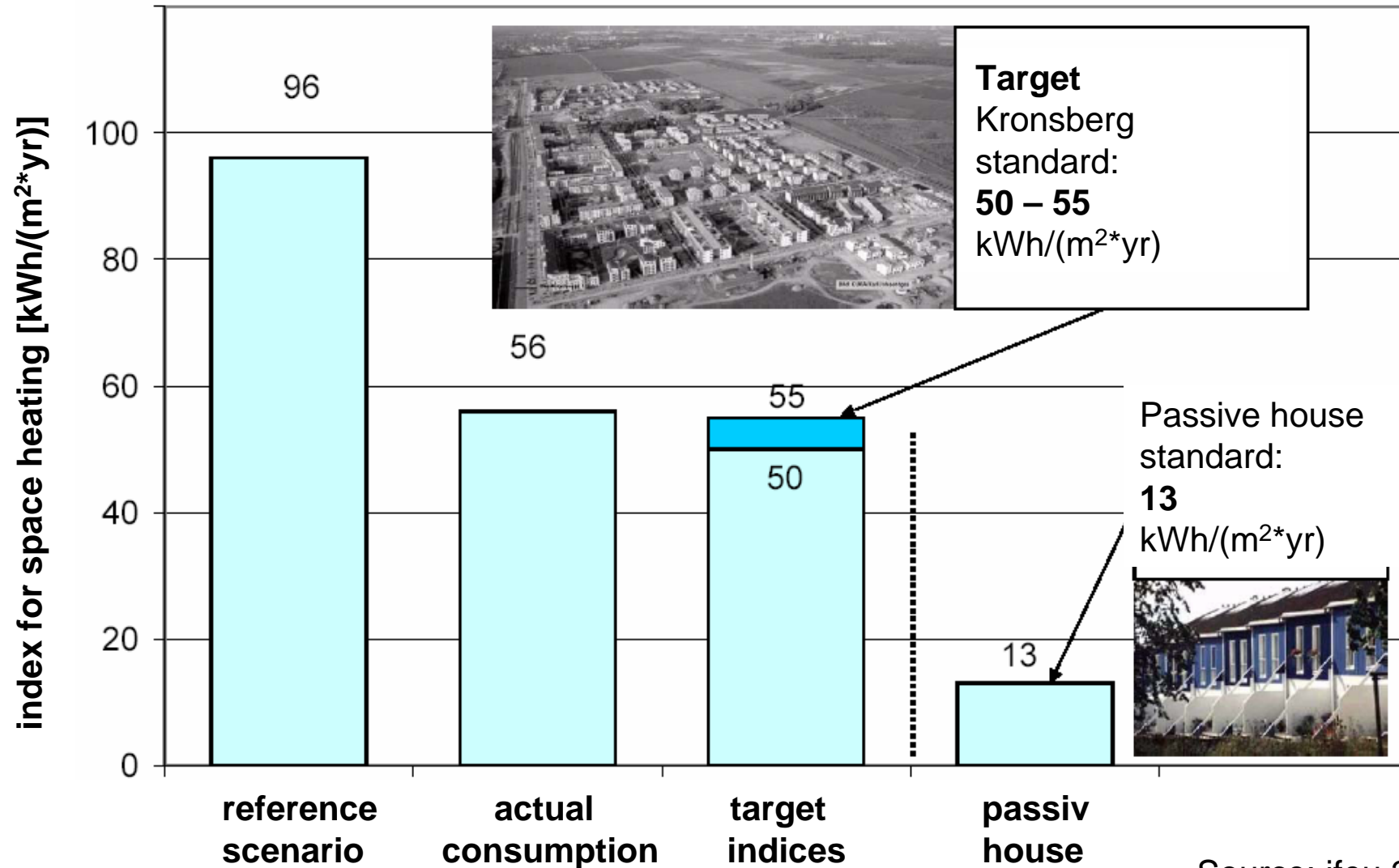
Energy Concept: Expected CO₂-Emissions

Reference (100%): CO₂ emissions of reference scenario according to german insulation regulation 1995 with separate gas condensing boilers



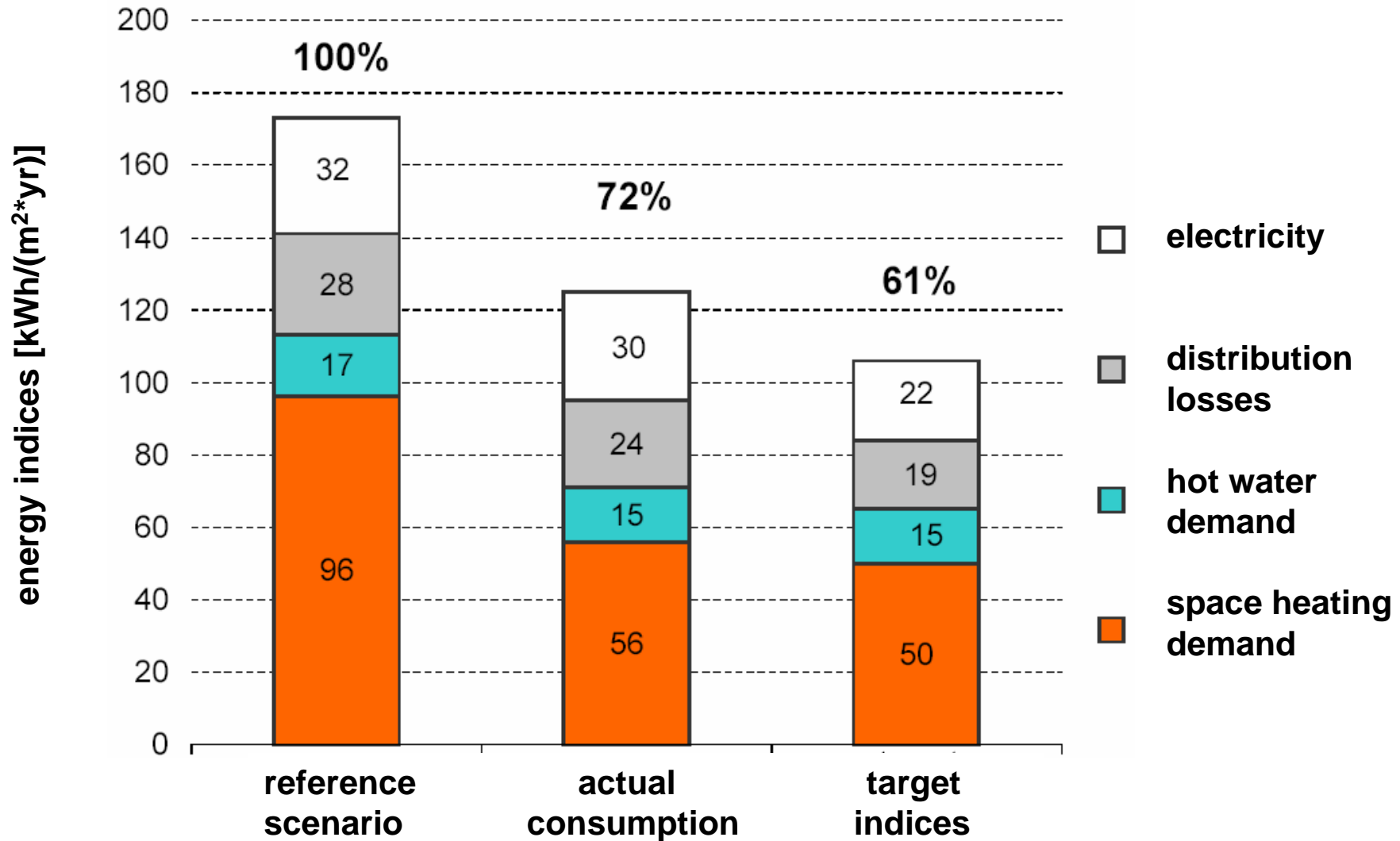
Source: KUKA (Kronsberg Environmental Liaison Agency GmbH) 1998

Actual Energy Consumption Indices for Space Heating



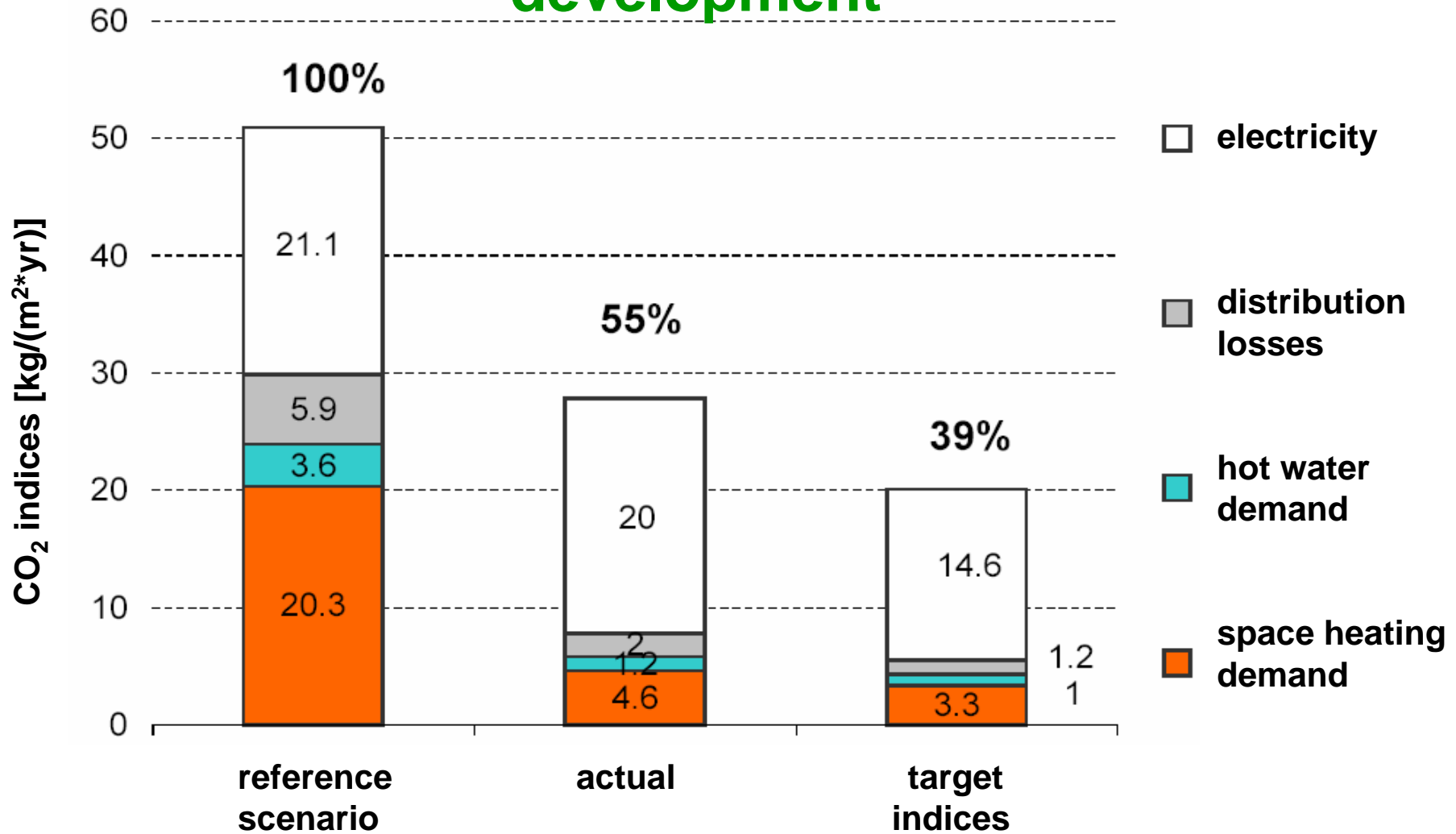
Source: ifeu 2003

Energy consumption indices for heating and electricity



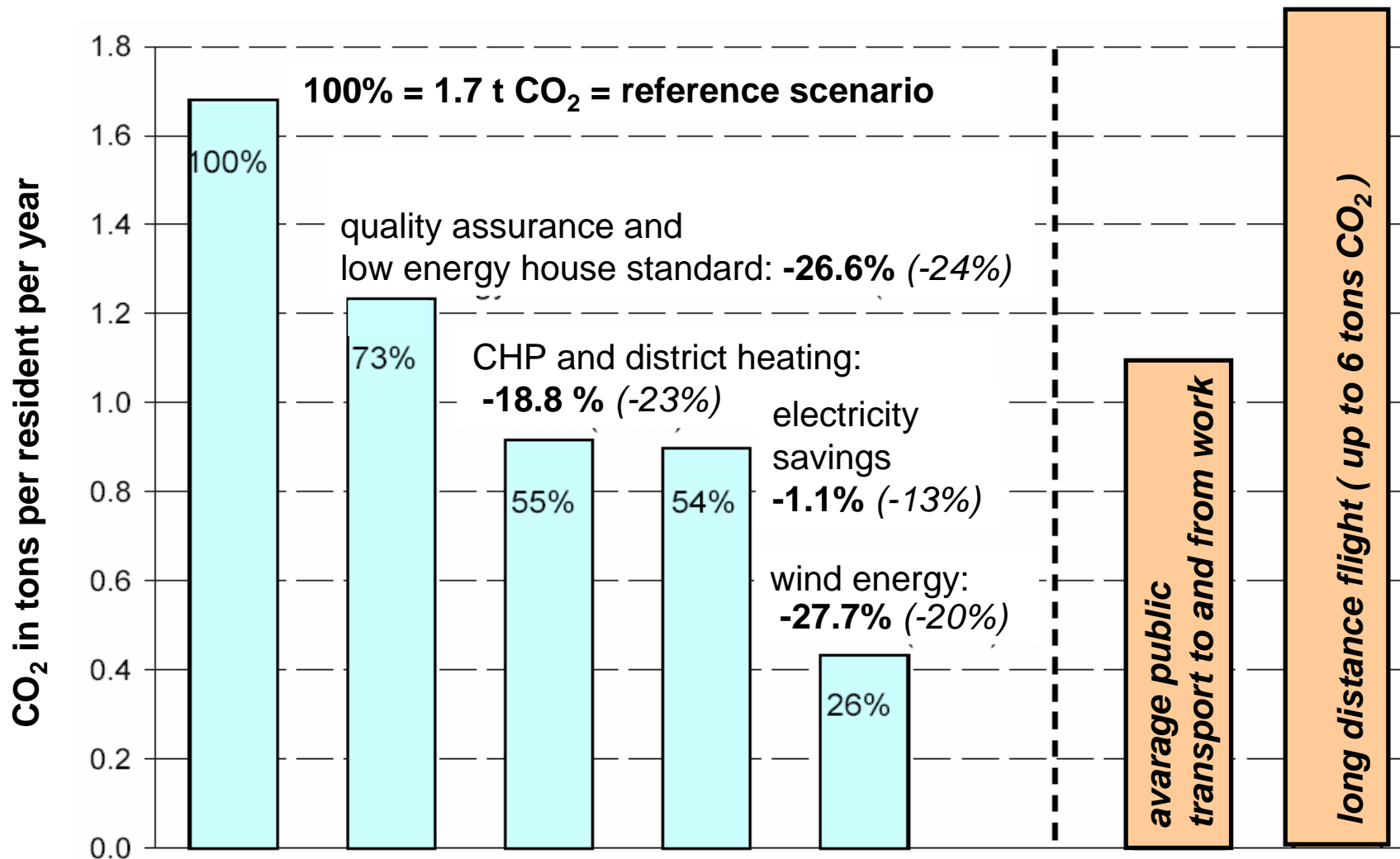
Source: ifeu 2003

CO₂ indices from the evaluation of Kronsberg development



Source: ifeu 2003

Actual CO₂-Emissions per Resident per Year



Source: ifeu 2004

Audit of energy conservation in German buildings

Questions:

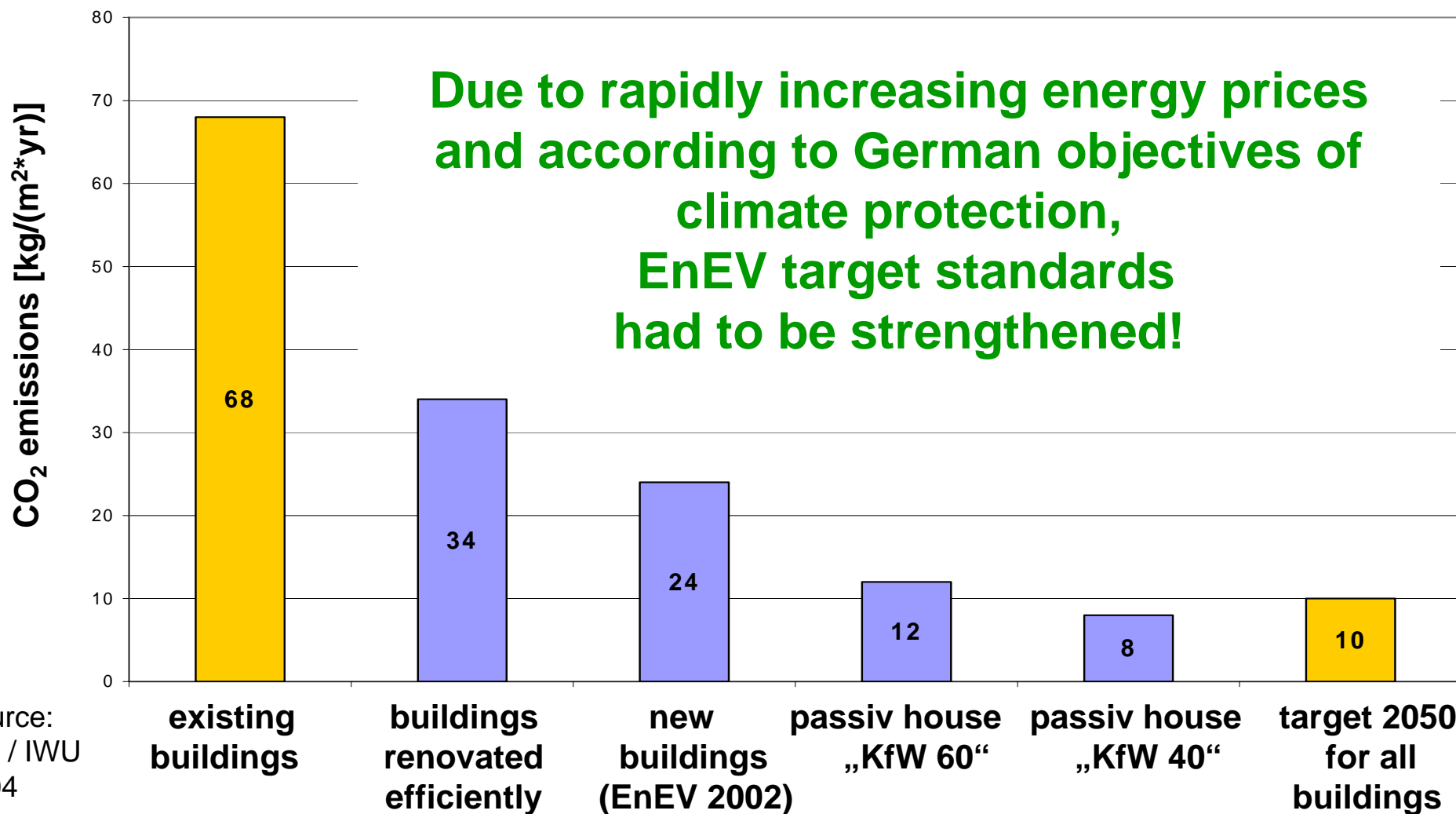
- ❖ In which way is the German energy saving ordinance from 2002 (EnEV 2002) implemented in common practice?
- ❖ What are the long term target standards of EnEV (2010)

Evaluation projects:

- Beiträge der EnEV und des KfW - CO₂ – Gebäude-sanierungsprogramms in Deutschland
- Evaluation und Begleitung der Umsetzung der EnEV 2002 in Baden-Württemberg

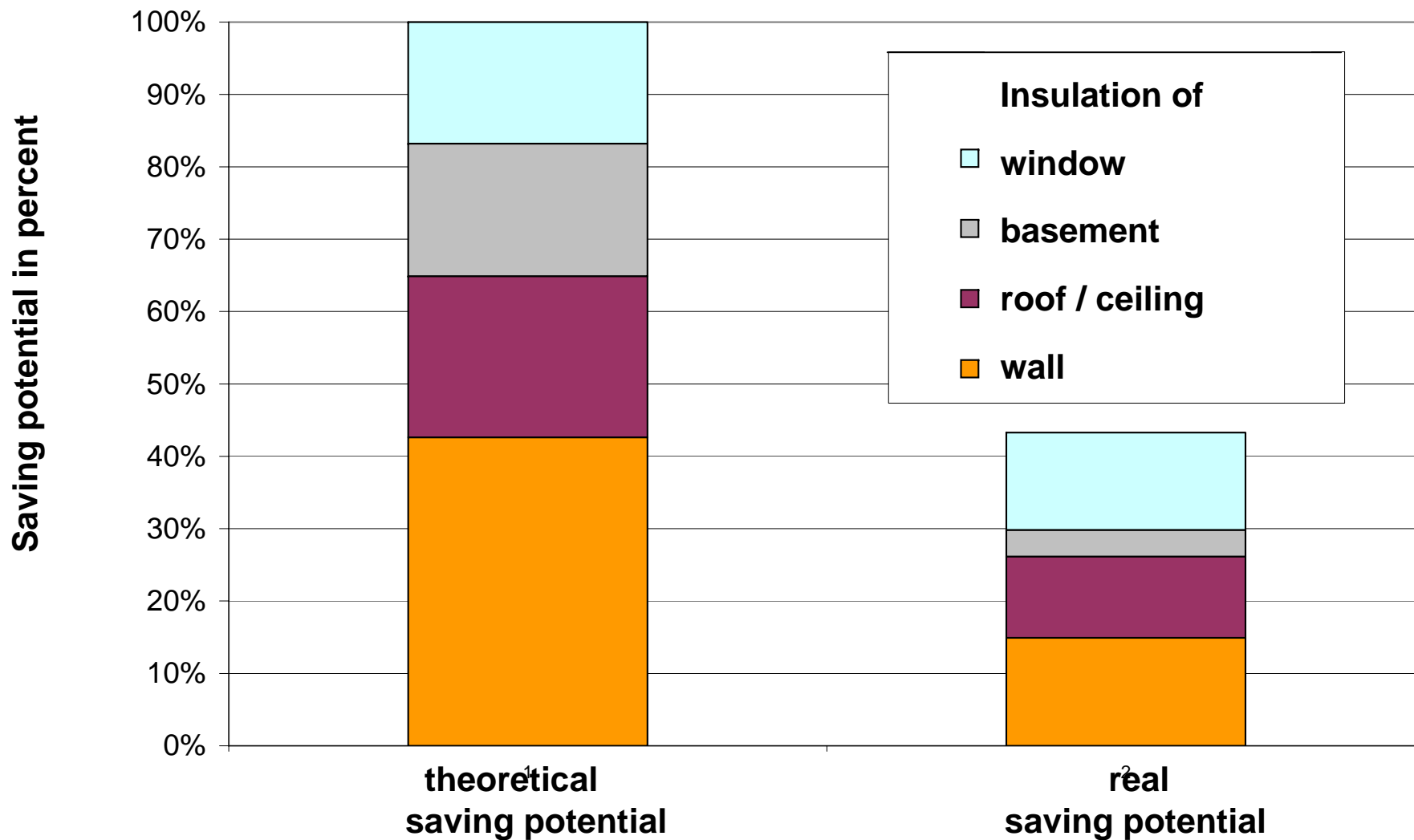
<http://www.ifeu.org/index.php?bereich=ene&seite=enev>

Necessary long term target standards of the German energy saving ordinance (EnEV)



Source:
ifeu / IWU
2004

Saving potential of German building stock by EnEV 2002



Reasons for the lack of implementation

- **Conservation standards are not yet adapted to the present energy price on the national level.**
- **Also external costs of energy use are not included.**
- **With the implementation of EnEV 2002 control systems on state level do not exist any longer.**
- **Private market partners submit to competition and are looking for the cheapest offer.**
- **There is a lack of information on cost effective measures of architects, engineers and craftsmen.**
- **Not enough well trained actors are able to realise ambitious standards (like the passive house standard).**

To ensure good practise construction, auditing actors' compliance and quality assurance is required.



I.e. Hannover Kronsberg Management included the following objectives into land sale contracts:

- compulsory low energy house standard
- airtight construction and minimisation of thermal bridges
- comfortable accommodation
- consistent planning and construction
- quality guarantees for the owner and user



The following quality assurance scheme was applied as a five-stage process throughout the entire construction period in Hannover Kronsberg :

stage 1: check the required energy index

stage 2: check detailed plans

stage 3: check work on site and documentation

stage 4: measure airtightness

stage 5: certification





**To improve knowledge of all actors
training programmes are necessary**

Best practise: Impulsprogramm NRW BAU und ENERGIE

- **training programmes for architects, ingenieers, craftsmen, owners and consumers.**
- **including about 30 education units from energy management to solar applications.**
- **„Wissensportal Energie“: Web Based Trainings**
- **„Solar – and Energy check NRW“: about 2000 handcrafts in NRW have been educated systematically.**



Quality labels guarantee independant and professional consulting services

Best practice: GIH Quality Label (Home energy consulting of engineers and craftsmen)

- **committed to independant consulting**
- **committed to constant training of staff members**
- **verification of consulting reports**
- **evaluation by the customer**
- **random tests of consulting activities**

<http://www.gih-bw.de/>

Conclusions

- **The economic saving potential remains largely untouched.**
- **The energy saving ordinance (EnEV) needs to be adapted to recent developments in energy prices.**
- **Random checks of actual EnEV-implementation should be introduced and carried out by governmental authorities.**
- **In order to implement sustainable renovation standards, members of the building sector need intensive training.**
- **In combination with the energy pass for buildings, we suggest to introduce a quality label for independent energy consulting services.**

Thank you for your attention!



Lao Tse: Liebt die Dinge der Welt, aber verliert euch nicht an sie.