

**HOCHSCHULE
HANNOVER**
UNIVERSITY OF
APPLIED SCIENCES
AND ARTS
–
Fakultät II
Maschinenbau und
Bioverfahrenstechnik



Short summary of final report

Research project

**„Review and update of the relationship between energy
efficiency and the open market value of residential
buildings “**

Short title:

EnerWert II

Sponsored by

The Research Initiative ‚Future of Construction‘ of the Federal
Institute for Research on Building, Urban Affairs and Spatial
Development

(Ref.: II 3-F20-11-137 / SWD-10.08.18.7-13.30)

Point of departure and definition of project

The reason for EnerWert II was the follow-up to the EnerWert I research project (Ref.: I113 800 106 -17).

One task was: the connections identified between sale proceeds and the energy efficiency of residential buildings were brought up-to-date. New tendencies that influence the open market value were established. Furthermore, it was elicited whether and how it is possible and sensible to embed the factor energy efficiency in a standardizing way as a core indicator in buying price data banks.

Subject of the research project

The significance of modernizing buildings has been increasing continuously for years and its turnover has long since overtaken turnover from the construction of new buildings.

Knowledge about the value-relevant features of buildings in stock are currently the foundation of successful property project developments.

Environmental sustainability, cost effectiveness and appropriateness of use are already guiding principles of decision-making with regard to rentability, overheads and the resale value of residential buildings, and shall be much more so in future.

The first stage of the EnerWert I project was carried out in the time period 2006 – 2007.

In the meantime, the status of the energy efficiency-related data in the purchase price records of the expert committees has improved considerably.

Through modernization activities, the energy efficiency parameter as a feature describing value is distinctly more meaningful than, for instance, the year of construction, which still counts as a core indicator.

EnerWert I demonstrated that there are important dependencies between the aspects energy efficiency and the open market value of residential buildings. The importance of energy-saving characteristics is beyond question, however, in the majority of the already modernized objects looked at, the energy-saving measures taken were more costly than the added-value sale sum reached on the market.

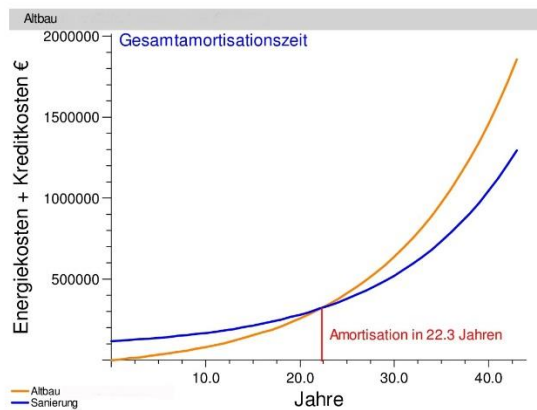


Illustration 1: Example – progression of the whole amortization period of a building, (Source: Suijlen 2015)

It was for this reason that in this EnerWert II research work, the previous results from the two partial markets already observed in Nienburg and Hannover in EnerWert I were brought up-to-date and extended by the more broadly scattered market observations based on the general purchase price records of the expert committees.

The project and market observation period was 2 years in order to be able to illustrate developments and tendencies with certainty.

- Phase I: follow-up to the market observations of the partial markets Nienburg and Hannover,
- Phase II: further development of market observation and analysis of criteria,
- Phase III: broadening of the partial markets observed,
- Phase IV: evaluation, model development, and also
- Phase V: documentation and finalizing

The realization of the energy and climate protection-specific goals of the German government is still on the agenda, and thus requires an adjustment of the drawn-to-scale value criteria in all sectors of business and trade. The open market value of buildings is of significance both in social economics and environmental politics.

The project provides a consolidation of the results and findings compiled through EnerWert I, which were already very much in step with actual practice. By bringing the data bank up-to-date and enlarging it, and through methodical finalization and critical

further development, a direct impulse could be created for the practical work in defining the open market value.

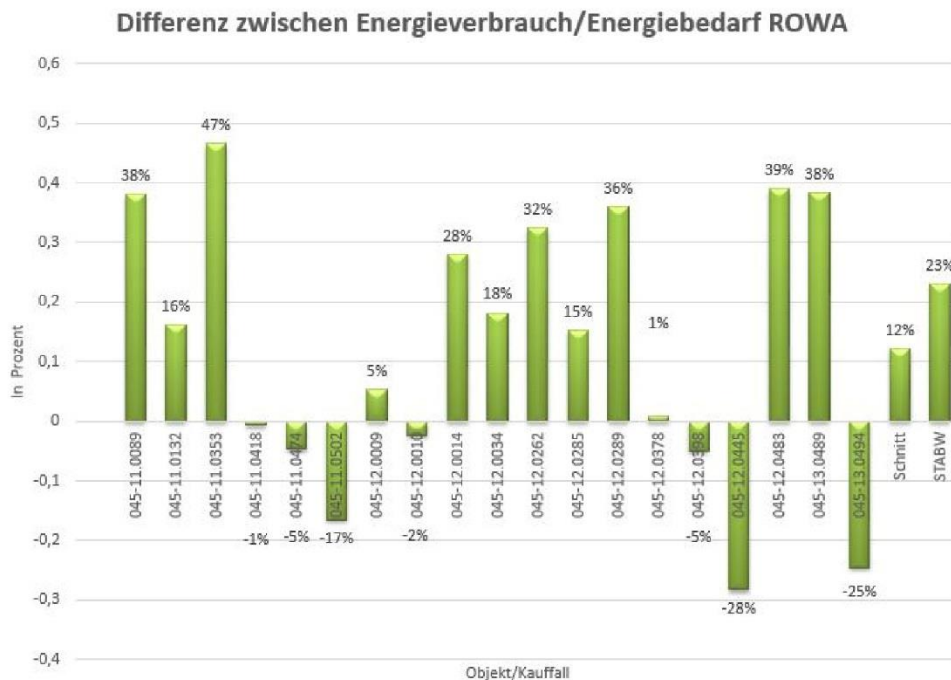


Illustration 2: Percentage range difference of the energy values in the ROWA-Soft calculation, demand / consumption, (Source: Suijlen 2015)

The energy-saving analysis of 182 objects in Nienburg and 299 objects in Hannover based on the EnEV, plus related norms, was a huge challenge within the scope of the research project. It was mastered with the help of the EnEV standard building physics program – heat and steam from ROWA Soft and the short procedure program IWU-KVEP, which is not far behind as far as its technical performance and analysis options are concerned.

In this way, for instance, concrete information and procedures for the practice of establishing a value were provided in table form and also software-oriented.



Illustration 3: Building with higher energy consumption than necessary for its needs, Deviation -28 %, (Source: Bethe 2015)

During the evaluations phase, the data were entered into the general purchase price records of the expert committees in Sulingen and Hannover, and the existing data banks were amended and evaluated.

Research project: conclusion

The economical view of energy-saving features and characteristics of buildings is of increasing importance when one considers the present ecological, energy and construction industry developments.

The analysis of the methods and procedures available demonstrated that helpful approaches for the establishment of the value influenced by energy-saving could be taken from the area of dynamic cost effectiveness investigation.

Carrying the title „en - DCF“ (energy-saving Discounted Cash Flow method), a model taking energy-saving aspects into consideration was designed, following the capital value method. The en - DCF – model works with discounted energy cost savings as opposed to typical standard values of the year of construction.

In order to be able to render value development statements meaningfully plausible, a procedure with the title „Energiener“ was developed for cost effectiveness investigations based on construction components' life cycles.

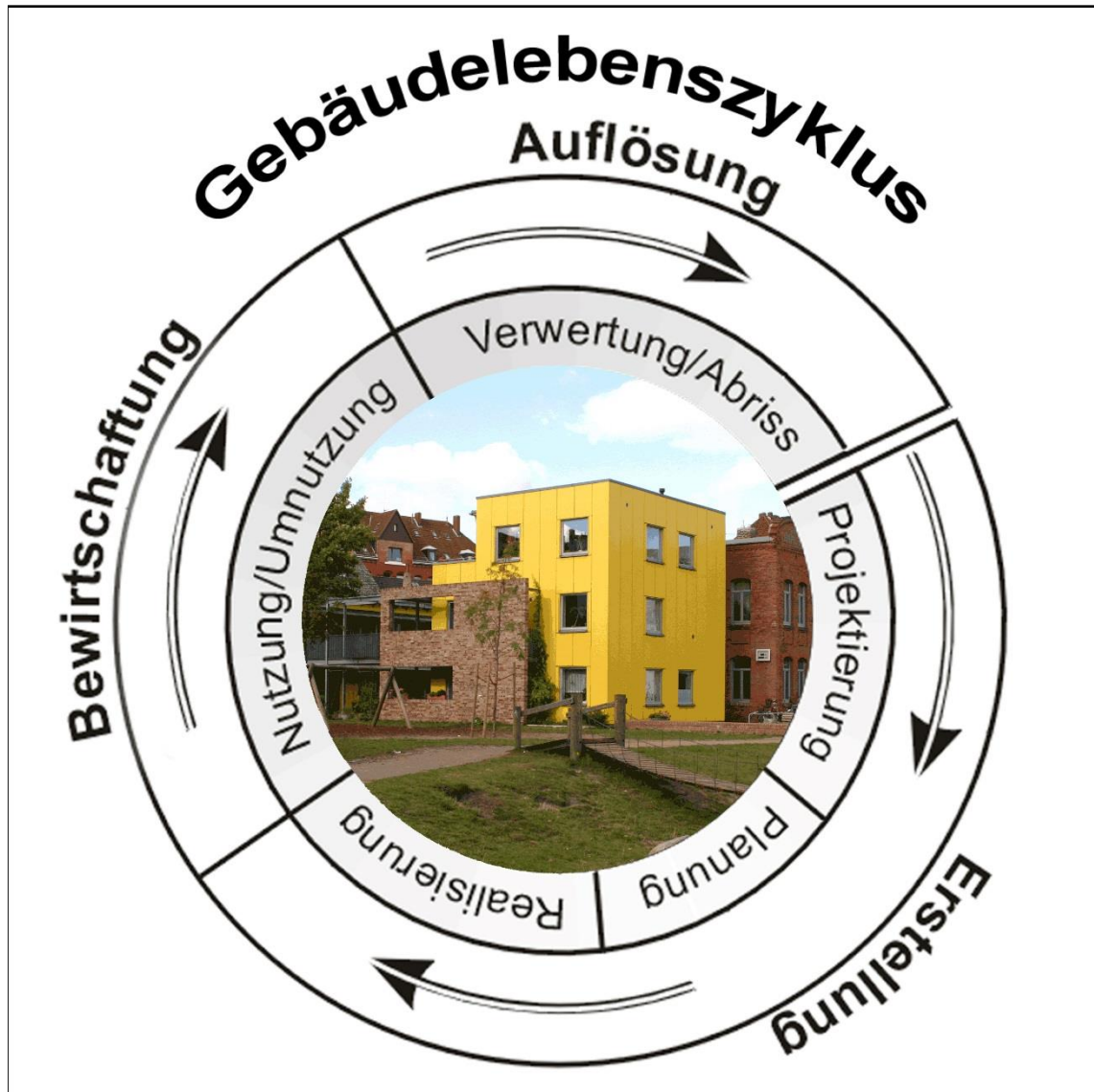


Illustration 4: Life cycle phases of residential buildings, (Source: Bethé 2015)

Set at this point, the method developed with the title "EmA - NHK" (energy-saving modified fitting standards of normal production costs) provides suggestions of procedures that integrate energy-saving parameters into the existing procedure to establish the property value via normal production costs (NHK), according to the guidelines to establish the value of property (WertR).

As an additional flanking measure, a system based on the surface area of a building's 'envelope' was designed to establish energy-saving modernization costs. Empirically

established statistical values of energy-saving modernization costs from the evaluated modernization objects formed the data set used for this.

The band width of the empirically established, final energy-saving extent of change in value w' lies between 0.81 – 0.94 € per more efficient kWh/m² p.a. (MFH) and 1.10 – 1.26 €/kWh/m² p.a. (EFH/ZFH), depending on the type of building, use and building classification (Ref.: QE, Wohnfläche = Living space).



Illustration 5: Building with higher energy requirement than actual consumption, Deviation +47 %, (Source: Bethe 2015)

The values confirm the change in value w' which can be deduced via en – DCF, and exemplarily via the EmA - NHK – model.

Parameters of the research project

Research project EnerWert II, Ref.: II 3-F20-11-137:

Review and update of the relationship between energy efficiency and the open market value of residential buildings

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