

## Zukunft Bau

### Structure / Table of contents summary report

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#### Title

Long version title: "Further development of the assessment criteria "Indoor air quality", "Emissions from Hazardous Materials", "Dismantling and Recycling" and "Resistance to Natural Hazards" for the German sustainability assessment scheme "Bewertungssystem Nachhaltiger Kleinwohnhausbau (BNK)"

#### Background of the project

The purpose of the BNK system is to evaluate newly constructed dwellings with sustainability criteria. On first catalogue of assessment criteria was published by the German Federal Ministry of Building (BMI) in 2015. Further need for research has been identified for the criteria "Indoor Air Quality", "Emissions from Hazardous Materials", "Dismantling and Recycling" and "Resistance to Natural Hazards".

#### Subject of the research project

As part of the research project, selected aspects of the "Bewertungssystem Nachhaltiger Kleinwohnhausbau (BNK)" assessment system were further developed. The four criteria "Indoor air quality", "Emissions from Hazardous Materials", "Dismantling and Recycling" and "Resistance to Natural Hazards" were examined and new assessment methods and criteria have been developed in cooperation with a select group of experts. The new assessment procedures and criteria were validated in a pilot phase in which nine small residential buildings participated. The research project was divided into the following four work packages:

- Work Package 1: Basic Analysis
- Work package 2: Development of the new criteria
- Work package 3: Carrying out the pilot phase
- Work package 4: Evaluation of the results and adaptation of the assessment criteria

In the first part of the research project assessment systems for sustainable buildings as well as relevant research projects with regard to the four thematic areas have been analysed. Furthermore, relevant standards were analysed and the results of the first BNK pilot phase from 2014 were evaluated.

Based on these results, in the second part of the project, new evaluation procedures and benchmarks for the integration of the four subject areas into a future version of the BNK system were developed. The new subject areas were integrated into three existing criteria of the BNK system. The "Indoor air quality" and "Emissions from Hazardous materials" were integrated into the criteria 1.1.1 "Indoor Air Quality and Emissions from Hazardous Materials" and extended by new assessment procedures and benchmarks. The topic "Dismantling and Recycling" was retained as part of the criterion "4.2.1 Building Documentation and User Instruction", but with clear specifications for the creation of a material catalogue and a new assessment procedure for building recycling concepts. The topic "Resistance to Natural Hazards" was integrated into the criteria "4.1.1 Consultation and Objective Agreement" using a risk assessment for natural hazards. Therefore new guidelines for carrying out the risk assessment have been developed.

In the third part of the project, the new criteria were discussed in the framework of expert workshops and tested in a pilot phase on nine real small residential buildings. In addition to the results of the building qualities, the participants of the pilot phase were also asked about the informative value, steering effect and the effort required to evaluate and document the new criteria. The results of the evaluation show that the new assessment procedures are fully applicable in practice and offer considerable added value for planners and home builders. However, the steering effect and practicality of the new assessment procedure for the recycling concept was called into question by the external experts, as it still leaves too much room for interpretation in the classification of the dismantling and recycling capability of individual building components. The additional time duration spent for assessment and documentation of the new evaluation procedures and criteria was in average 32 hours per building.

In the fourth part of the project, the new criteria were revised based on the results of the pilot phase and feedback from the participating external experts. The final design concepts will then be integrated into a future version of the BNK system.

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## Conclusion

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The aim of the project was to further develop the assessment criteria of the German sustainability assessment scheme "Bewertungssystem Nachhaltiger Kleinwohnhausbau (BNK) and to evaluate the results in a pilot phase in order to improve the quality and applicability of the system. The following results have been achieved:

- Development of new assessment criteria and evaluation procedures
- Carrying out a pilot phase with nine case study buildings
- Evaluation of the time and cost effort for the building assessment
- Analysis of the practicability and steering effect of the new criteria
- Development of new criteria profiles and recommendations for an upgraded version

## Key data

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Short title: Further development and adaptation of selected criteria of the BNK system

Researcher / Project Management:

Prof. Dr. Natalie Eßig

Paul Mittermeier M.Sc.

Total cost: 81.540,00 €

Share of federal subsidy: 57.065,00 €

Project duration: 12 month

## PICTURES / FIGURES:

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Figure 1: BNK\_Siegel.pdf



Caption: Seal of the BNK quality label of the Federal Ministry of Construction

Figure 2: BNK\_Logo.pdf



Caption: Logo of the BNK system

Figure 3: Fachexpertenworkshop\_Berlin



Caption: Workshop with external experts for the further development of the BNK system in Berlin

Figure 4:



Caption: Pilot building "Model house in Günzburg constructed by the Franz Gussek GmbH & Co. KG"

Figure 5: BiRN\_Logo.pdf



Caption: Logo of the German certification authority for the BNK-System "BiRN"