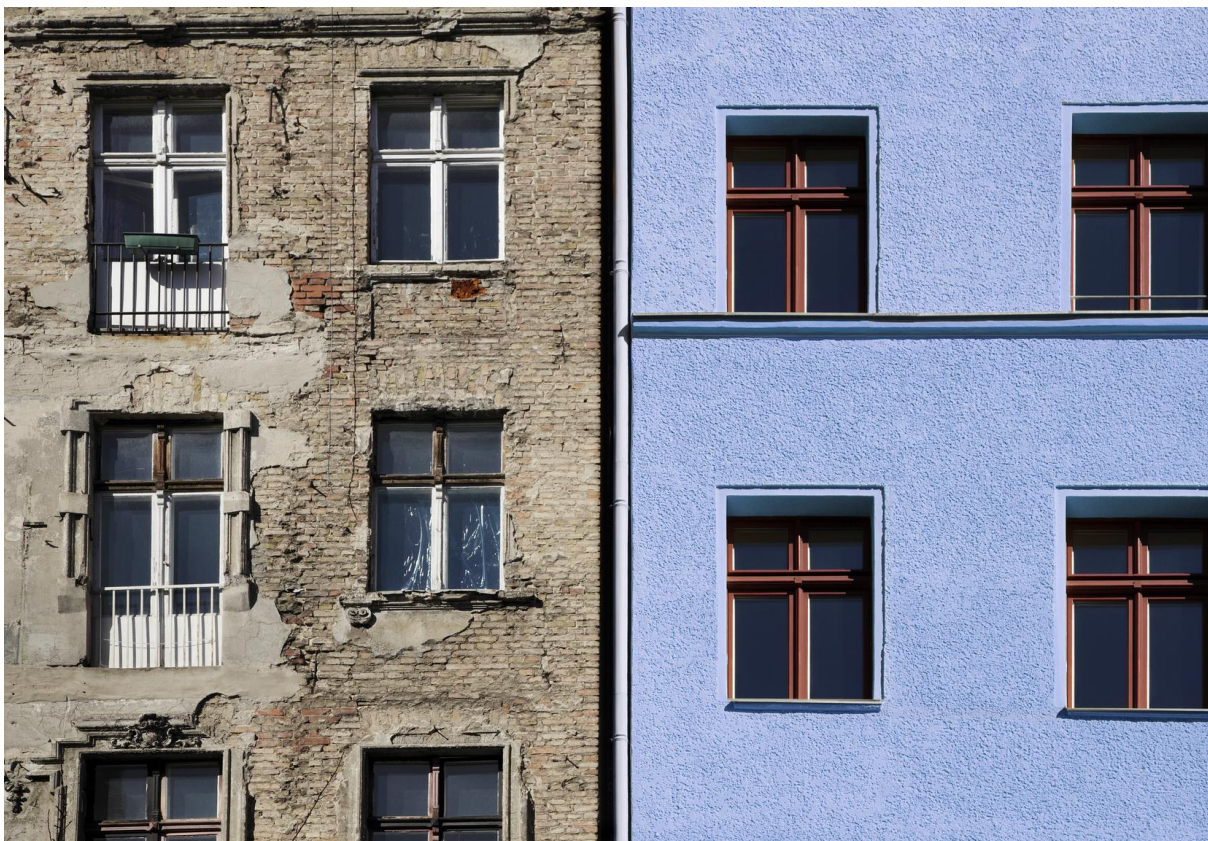


Synopsis

Evaluation of the EBS WG funding programmes in the funding year 2021 (1st half- year)

Evaluation of the "Energy-efficient construction and refurbishment" funding programmes for residential buildings (EBS WG) as part of the BMWK's CO₂ building refurbishment programme in the funding period 2018 to 2021



1 Background: task and evaluation design

In 2019, the Federal Ministry of Economics and Climate Protection (BMWK) commissioned Prognos AG and FIW München to evaluate the *Energy-efficient Construction and Refurbishment in the Residential Buildings programme* (EBS WG) for the funding years 2018 to 2021 (first half of the year). The evaluation is part of the performance review by the BMWK. According to §7 of the Federal Budget Code (BHO), it is subdivided into target achievement control, impact control and economic efficiency control. In addition, the evaluation is to answer key questions of the BMWK and develop recommendations for action based on the evaluation results.

The evaluation takes up the specifications of the BMWK's *Methodology Guide for Evaluations of Energy Efficiency Measures*. It is based on the evaluation of the funding data for EBS WG in the 2021 (1st half-year) funding year, which was provided by KfW in December 2021. A survey of the grant recipients was not conducted. The savings effects were determined using FIW's Building Model Germany and the economic effects using Prognos AG's input-output model. The data and information required for this, which were obtained from the survey of grant recipients in the previous evaluations, were derived from the available empirical data, particularly for the 2020 funding year.

2 EBS WG-Programme in 2021 (1st half-year)

In the 2021 (1st half-year) funding year, funding with EBS WG consists of the following sub-programmes

- **Energy-efficient construction** (KfW 153) for the construction of new buildings in accordance with efficiency house standards as loan funding,
- **Energy-efficient refurbishment – Loan** for the complete refurbishment of existing buildings to efficiency house standards (KfW 151) or for refurbishment with individual measures (KfW 152) as loan subsidies,
- **Energy-efficient refurbishment – Investment grant** (KfW 430) for the complete refurbishment of existing buildings to efficiency house standards or for refurbishment with individual measures as grant funding,
- **Energy-efficient construction and refurbishment – Grant Construction supervision** (KfW 431) for specialised energy planning and construction support for residential buildings by an independent energy efficiency expert. The funding can be combined with all the above-mentioned programmes and can only be used in combination with one of these programmes.

All parties responsible for investment measures (e.g., private individuals, condominiums, companies, municipalities, and other actors in the housing industry) can apply for funding. An exception is the KfW 430 grant programme, which is only open to private building owners. The loan funding scheme includes a loan reduction and a repayment subsidy. Eligible individual measures consist of three main categories: heating measures, ventilation measures and measures on the building envelope.

The funding conditions and objects correspond to those of the 2020 funding year (increased funding intensity compared to the 2018/2019 funding year, significantly restricted funding for heating measures).¹ However, the eligible individual measures continue to consist of the three main categories of heating measures², ventilation measures³ and measures on the building envelope.

The funding with EBS WG was gradually replaced by the federal funding for efficient buildings in 2021 (BEG). At the beginning of January 2021, the grant funding for individual measures (BEG EM) started at BAFA. In addition, the KfW 430 grant funding for refurbishment into an efficient house and the loan funding via the EBS programmes KfW 151, 152, 153 as well as the funding for construction support (KfW 431) were continued until the end of June 2021 and finally replaced with the start of the BEG funding at KfW on 1 July 2021. The BEG funding was not the subject of the evaluation.

The funding with EBS WG is intended to contribute to achieving the sector targets for the year 2030 in the Climate Protection Plan as well as to achieving a nearly climate-neutral building stock in 2050. It is intended to trigger new construction and refurbishment measures in the target groups and thus contribute to energy and climate policy goals (energy/CO₂ savings), socio-political goals (reduction of investment/heating costs) and economic policy goals (support for small and medium-sized enterprises).

¹ Eligibility of biomass systems, gas condensing boilers, wood gasification systems, oil condensing boilers, solar thermal systems, heat pumps and APEE heating packages is discontinued. In the case of ventilation measures, the eligibility of the APEE ventilation package is discontinued.

² District/local heating supply, optimisation of the heating system.

³ Exhaust air and ventilation systems.

3 Overview of funding in 2021 (1st half-year)

Overall, the EBS WG programmes and their system are widely accepted on the market. In the 2021 (1st half-year) funding year, a total of around 110,000 measures in 245,000 residential units were funded with a commitment volume of around 18.7 billion euros.⁴ Almost 27 billion euros in investments were made by the recipients. 3.8 billion euros were spent on funding from federal funds.

Table 1: Overview of funding in 2021 (1st half-year)

Programme	Recipients of funds [Number]	Residential Units [Number]	Commitment volume [Sum in Mio. Euro]	Investment volume [Sum in Mio. Euro]
KfW 153 Construction	61,281	149,230	15,653	20,716
KfW 151 Refurbishment	6,638	32,673	2,190	4,113
KfW 152 Refurbishment	5,855	22,677	499	1,130
KfW 430 Refurbishment	5,441	9,406	254	942
KfW 431 Construction supervision	31,199	31,240	122	247
Total	110,414	245,226	18,719	27,149

Prognos and FIW 2022.

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About half of the funding cases are accounted for by new buildings (KfW 153). In terms of commitment and investment volume, new buildings play a dominant role – they account for over 84 percent of the commitment and 74 percent of the investment volume. Around 70 per cent of the federal funds will be used for the new buildings.

Most applicants are private building owners (95 percent). However, their share is significantly lower in terms of housing units (58 percent), commitment and investment volumes (both 64 percent). It is noticeable here that commercial grant recipients (housing companies including municipalities/municipal enterprises) generally refurbish or construct larger buildings with more residential units.

Due to the changed funding conditions, the individual measures in the funding year 2021 (1st half-year) under consideration focus on energy improvements to the building envelope. In the case of complete refurbishments, all efficiency house levels will be called up equally. In new construction, the clear focus is on the Efficiency House 55 (EH 55) standard.

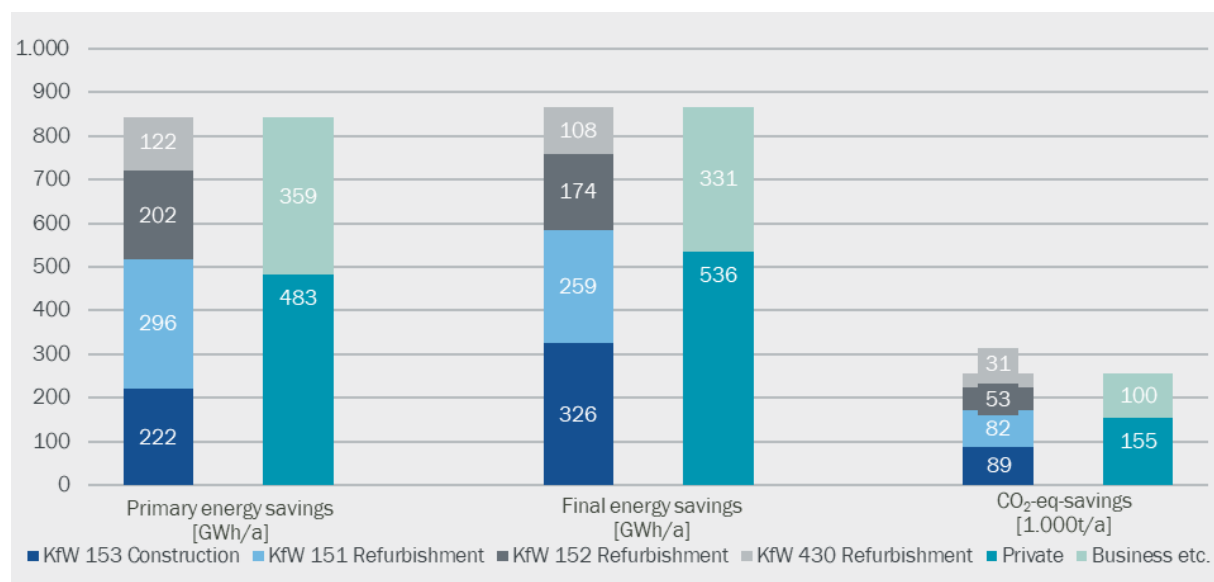
The regional focus of funding is in the densely populated and generally economically strong federal states of Bavaria, Baden-Württemberg and North-Rhine Westphalia. This is where most of the funding cases/residential units and the highest commitment and investment volume are located. In the eastern German states, on the other hand, the demand for funding is lower.

⁴ The approved volume is made up of the lending volume of the loan programmes and the grant volume of the grant programmes.

4 Achievement of objectives in 2021 (1st half-year)

The funded measures of 2021 (1st half-year) will save around 0.9 TWh of final energy or 0.8 TWh of primary energy per year. This leads to an annual reduction in GHG emissions of around 255,000 tonnes of CO₂ equivalents. The largest share of the savings is accounted to new buildings and the complete refurbishment of private buildings.

Figure 1: Annual savings 2021 (1st half-year)



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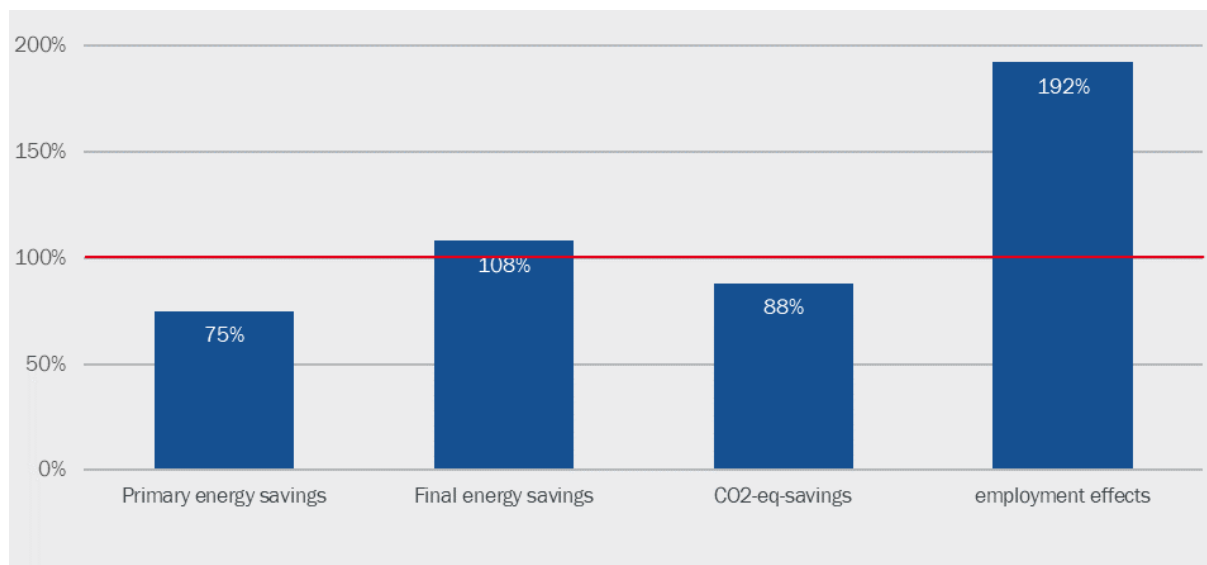
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The investments initiated by the funding trigger gross value-added effects of about 24 billion euros in Germany and – correspondingly – secure or create about 326,000 full-time jobs. These effects occur particularly in small and medium-sized enterprises. The main drivers of gross value-added and employment effects are new construction projects.

This means that the annual targets⁵ for final energy savings (target value 2.9 PJ) are exceeded by 8 percent and employment effects (target value 190,000 FTEs) by 92 percent. In contrast, the reduction of GHG emissions is 12 percent below the target value of 290,000 t CO₂-eq, while the primary energy savings are a quarter below the target value (4 PJ). The main reason for the different degrees of target achievement is the funding focus on new buildings. Although this has high investment and gross value added effects, it only makes a small contribution to the savings compared to the individual measures.

⁵ Since the funding with EBS WG only took place for the first half of 2021, the target values were adjusted accordingly compared to the previous years.

Figure 2: Degree of target achievement 2021 (1st half-year)



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With the funding, all intended target groups are reached to an adequate extent. Only municipalities/municipal enterprises are underrepresented

5 Impacts and effects of funding in 2021 (1st half-year)

The funding of EBS WG in 2021 (1st half-year) will also reduce energy/heating costs by a total of 3.4 billion euros via energy savings, reduction of GHG emissions and employment effects.

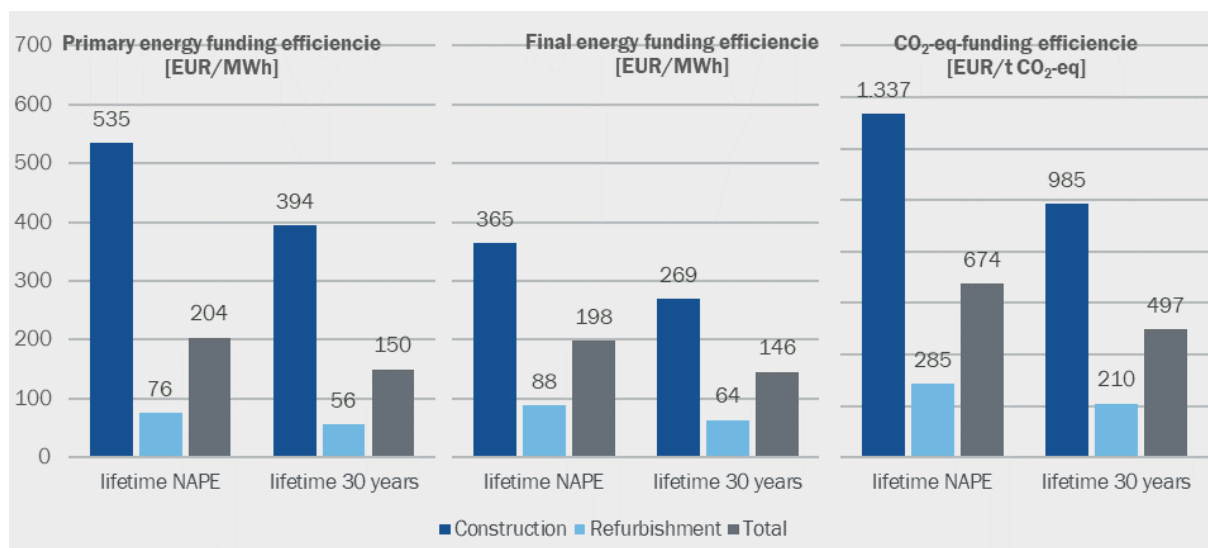
These effects, as well as the leverage and additionality effects that occur (leverage 7.9; around 8.4 billion euros in additional investments), indicate the suitability of the EBS WG funding and the causality for the occurrence of effects and the achievement of objectives. The additional funding environment around the analysed EBS WG programmes has a supporting effect: synergies are created, such that various programmes are often used in combination or alongside each other or to complement each other. Particularly worth mentioning are the on-site consultations and the programme for heating optimisation.

Further occurring effects or deadweight, carry-over and expansion effects could not be determined due to the lack of empirical data. However, it can be assumed that there have been no fundamental changes compared to the results of the evaluations of the previous years.

6 Economic efficiency of funding in 2021 (1st half-year)

On average, 15,000 euros must be invested for the annual reduction of CO₂ emissions by one tonne, and 4,382 and 4,514 euros in subsidies for the annual saving of one MWh of final and primary energy, respectively. Considered over lifetime of the subsidised measures, the expenditure amounts to 647 Euro/t CO₂-eq or 198 Euro/MWh_{FEC} as well as 204 Euro/MWh_{PEC}. New buildings are characterised by comparatively low funding efficiency, while refurbishments are much more cost-effective from the point of view of the funding provider. Compared to the 2018/2019 funding years, the economic efficiency deteriorates considerably. This is primarily due to the increased funding intensity from 2020, but also to the shift in the focus of implementation towards new buildings.

Figure 3: Funding efficiencies in 2021 (1st half-year)



If the employment efficiency is considered, new buildings are characterised by a higher funding efficiency. In total, about 11,600 euros must be raised to secure or create a full-time job. This points to a classic conflict of objectives: new buildings activate more investments and thus employment effects per subsidy euro. However, they lead to fewer savings per subsidy euro than refurbishment measures since the additional savings that can be achieved are comparatively low compared to the requirements for new buildings according to the Building Energy Act (GEG). In that logic, if more employment effects were to be achieved, the energy and emission-related funding efficiency deteriorates and vice versa.

7 Summary assessment

Overall, the EBS WG funding programmes are suitable and causal for achieving the objectives pursued with them. They trigger the intended impacts and stimulate investments for efficiency measures in the building sector. This is done at an economically justifiable cost, considering the contributions to Germany's energy and climate policy goals. A structural shift in the focus of demand towards new buildings is clearly evident, which despite the increase in demand leads to lower savings compared to the previous funding years. In addition, the changes to the programme (funding objects, funding intensity) are not reflected in a decline in the economic efficiency of the funding. Especially in the case of new buildings, however, there is a potential conflict of objectives when considering the funding efficiencies since new buildings activate more investments and employment effects per funding euro but lead to fewer energy and GHG savings per funding euro than refurbishments.

For these reasons, optimisation potentials are seen that could possibly be taken up in the future within the framework of the federal funding for efficient buildings (BEG). Particularly in the case of complete refurbishments/new buildings, this would involve targeted funding of the buildings with the highest savings potential and, if necessary, adjusting the requirement level and the efficiency house standard levels in the funding. The requirements system could also be adjusted to new challenges.

Regarding individual measures, the increase of subsidy rates or their linkage to the respective savings potential should be discussed to reduce the potentially insufficient cost effectiveness as one of the main (refurbishment) obstacles. Technical requirements may also need to be adjusted and systemic refurbishment approaches/combinations of measures strengthened.

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