

Synopsis

Evaluation of the EBS WG funding programmes in the funding year 2020

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 2020 funding year, which was provided by KfW in January 2021. In addition, further data and information was collected from a sample of around 6,000 grant recipients via an online survey. The savings effects were determined using FIW's Building Model Germany and the economic effects using Prognos AG's input-output model.

2 EBS WG-Programme in 2020

In the 2020 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 were modified with the resolutions of the Climate Cabinet 2019 compared to the funding years 2018 and 2019. The main changes are an increase in the funding intensity in all sub-programmes and the extensive exclusion of heating measures from the catalogue of eligible 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 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).

3 Overview of funding in 2020

Overall, the EBS WG programmes and their system are widely accepted on the market. In the 2020 funding year, a total of around 310,000 measures in 540,000 residential units were funded with a commitment volume of around 26.2 billion euros.⁴ Almost 57 billion euros in investments were made by the recipients. 5.9 billion euros were spent on funding from federal funds.

Table 1: Overview of funding in 2020

Programme	Recipients of funds [Number]	Residential Units [Number]	Commitment volume [Sum in Mio. Euro]	Investment volume [Sum in Mio. Euro]
KfW 153 Construction	92.351	199.813	20.999	46.294
KfW 151 Refurbishment	11.130	40.402	2.972	4.341
KfW 152 Refurbishment	11.176	44.889	934	1.104
KfW 430 Refurbishment	103.764	163.571	952	4.616
KfW 431 Construction supervision	91.096	91.781	313	626
Total	309.517	540.456	26.170	56.981

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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.

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

About half of the funding cases are accounted for refurbishments with individual measures (KfW 430, 152), about 10 percent by complete refurbishments (KfW 151) and about 40 percent by new buildings (KfW 153). In terms of commitment and investment volume, new buildings play a dominant role – they account for over 80 percent of the commitment and investment volume. Around 60 per cent of the federal funds will be used for the new buildings.

Most applicants are private building owners (98 percent). However, their share is significantly lower in terms of housing units (79 percent), commitment (65 percent), and investment volumes (71 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. Among private building owners, single-family and two-family houses dominate (about 57 percent). About one third of the subsidised housing units of private building owners are or will be rented out in the future.

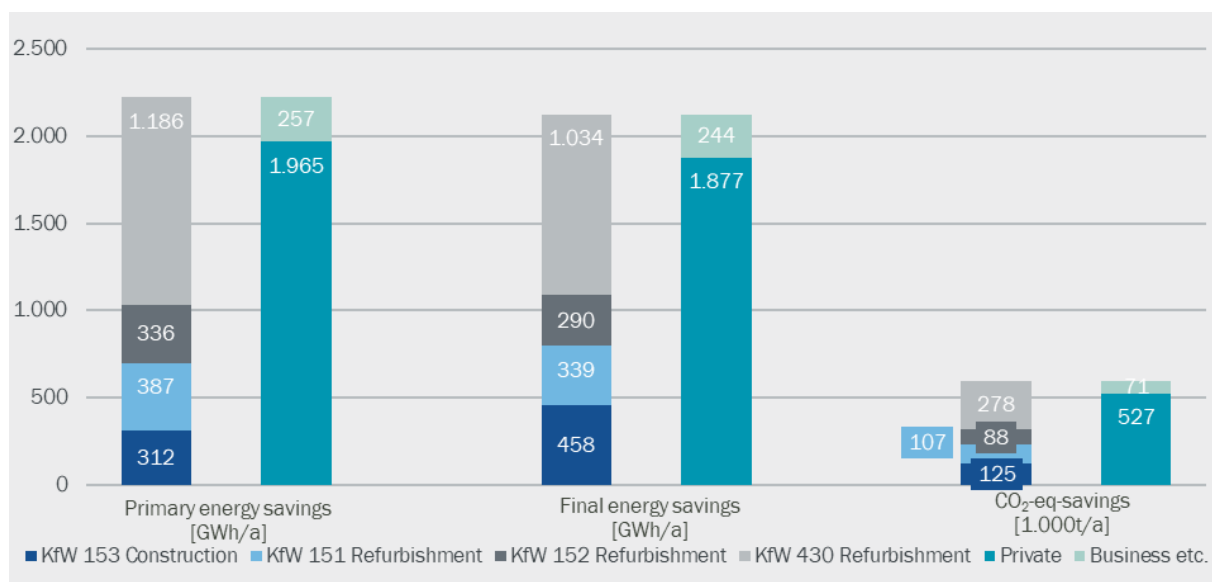
Due to the changed funding conditions, the individual measures in the funding year 2020 under consideration focus on energy improvements to the building envelope. In the case of complete refurbishments, all efficiency house levels will be called up equally. In new construction, the clear focus is on 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 and Baden-Württemberg. 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 Achievement of objectives in 2020

The funded measures of 2020 will save around 2.1 TWh of final energy or 2.2 TWh of primary energy per year. This leads to an annual reduction in GHG emissions of around 598,000 tonnes of CO₂ equivalents. The largest share of the savings is accounted to the refurbishment of private buildings (KfW 430).

Figure 1: Annual savings 2020



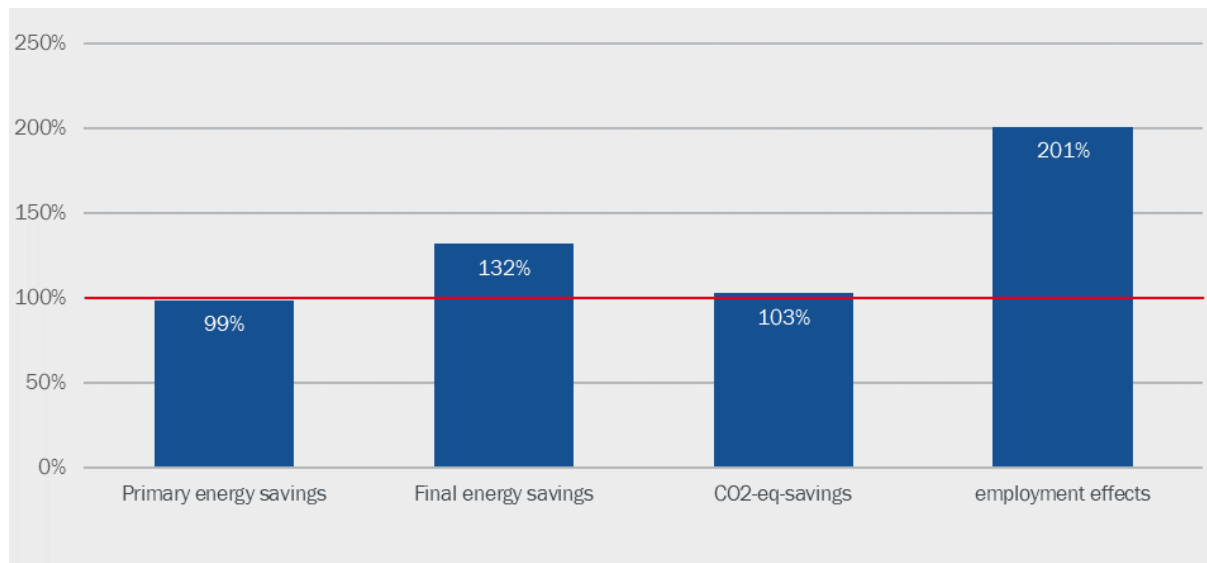
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The investments initiated by the funding trigger gross value-added effects of about 50 billion euros in Germany and – correspondingly – secure or create about 684,000 full-time jobs. These effects occur particularly in small and medium-sized enterprises. The main drivers of gross value-added and employment effects are new construction projects.

This means that the annual targets for final energy savings (target value 5.8 PJ) are exceeded by 32 percent and employment effects (target value 380,000 FTEs) by a factor of two. In contrast, the reduction of GHG emissions is just above the target value of 580,000 t CO₂-eq, while the primary energy savings are slightly below the target value (8.1 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.

Figure 2: Degree of target achievement 2020



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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 2020

In addition to energy savings, the reduction of GHG emissions and employment effects, the funding via EBS WG will have further impacts in 2020:

- renovation and new construction rates will be increased
- energy/heating costs will be reduced by a total of 10.2 billion euros
- The level of knowledge about possible efficiency measures will be increased among around 60 percent of the recipients of the subsidies.
- The scope of the planned measures (e.g., higher efficiency level, number of measures) is expanded through the funding
- Investment barriers – especially economic ones – are reduced by the funding.

These effects, as well as the leverage and additionality effects that occur (leverage 9.6; around 31 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. Although deadweight effects occur, they are mitigated to a large extent, especially by transfer and expansion effects. Overall, the gross impact is only reduced by around 15 percent. The reduction is higher for enterprises, i.e., higher deadweight effects and especially lower expansion effects can be observed

here. This can be explained by planned (replacement) investments and – in view of the low-interest phase in 2020 – as an investment strategy.

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.

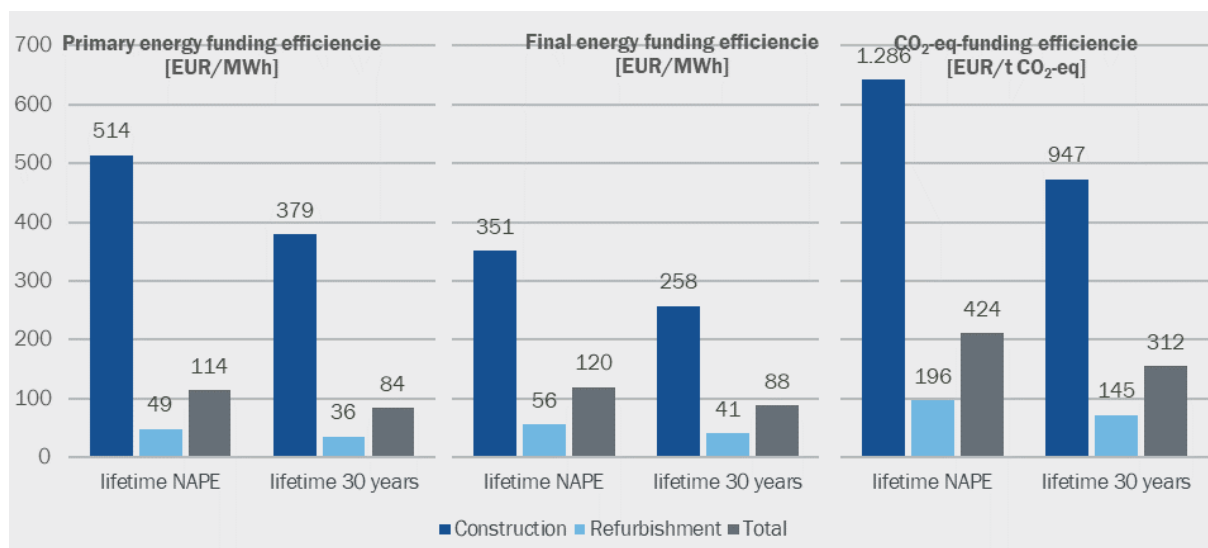
The Corona pandemic only had an impact on the implementation of measures for about one third of the respondents. These were mainly delays because of the lockdown or due to the reduced availability of craftsmen and building materials. For a small proportion, however, implementation could be extended (higher efficiency level, more measures) and/or accelerated.

The modifications of the EBS WG programmes due to the decisions of the Climate Cabinet 2019, on the other hand, only had a significance for the implementation of measures in about one third. For just under one tenth, these modifications made new construction/refurbishment attractive in the first place or led to an expansion (higher efficiency level, more measures).

6 Economic efficiency of funding in 2020

On average, 9,368 euros must be invested for the annual reduction of CO₂ emissions by one tonne, and 2,641 and 2,522 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 424 Euro/t CO₂-eq or 120 Euro/MWh_{FEC} as well as 114 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 2020



If the employment efficiency is considered, new buildings are characterised by a higher funding efficiency. In total, about 8,600 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 German Energy Saving Ordinance/ Building Energy Act (EnEV/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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Publication details

Evaluation of the EBS WG funding programmes in the funding year 2020

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Commissioned by

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Typesetting and layout: Prognos AG

Photo credit(s): Fotolia - Friedberg

Last amended: April 2022

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