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# **Evaluation of the KfW funding programs “EBS NWG” in the funding year 2019**

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## **Synopsis**

Study conducted on behalf of the Federal Ministry of  
Economics and Climate Protection (BMWK)

**Project Organisation:**

This project was conducted by

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## List of Acronyms

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BEG	Federal Funding for Efficient Buildings
BHO	Federal Budget Code
BMWK	Federal Ministry of Economics and Climate Protection
EBS NWG	Energy-efficient Construction and Renovation in the Non-residential Building Sector
EEP	KfW-Energy Efficiency Program
IKK	Municipal investment loan
IKU	Municipal enterprises investment loan
NWG	Non-residential building

PJ

Petajoule

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## 1 Background: Task and Evaluation Design

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To support the construction or initial acquisition of energy-efficient non-residential buildings (NWG), the renovation to so-called efficiency buildings, as well as the implementation of single measures to improve building energy efficiency, the CO<sub>2</sub> Building Renovation Program of the Federal Ministry of Economics and Climate Protection (BMWK) provided funding in the form of low-interest loans and, under certain conditions, repayment subsidies through the KfW-funded program, “Energy-efficient Construction and Renovation in the Non-residential Building Sector (EBS NWG)” until its replacement by the new program “Federal Funding for Efficient Buildings (BEG)”. Non-residential buildings of municipal and social infrastructure as well as municipal and commercial enterprises were supported. Until June 30, 2021, funding applications could be submitted to KfW for the following three sub-programs within the EBS NWG:

- Municipal investment loan (IKK) – Energy-efficient construction and renovation (KfW 217 – construction / KfW 218 – renovation)
- Municipal enterprises investment loan (IKU) – Energy-efficient construction and renovation (KfW 220 –construction / KfW 219 – renovation)
- KfW Energy Efficiency Program (EEP) – Energy-efficient construction and renovation (energy efficiency in companies) (KfW 276 –construction / KfW 277 – renovation / KfW 278 – single measures)

The Federal Ministry for Economic Affairs and Climate Protection commissioned Arepo GmbH and the Wuppertal Institute with the evaluation of these programs on their target achievement, impact, and economic efficiency as a contribution to performance review in accordance with §7 of the Federal Budget Code (BHO).

The focus of this synopsis is on the 2019 funding year. The main data and information basis for the evaluation is the KfW's funding data for the 2019 funding year (as of January 20, 2022), an online survey of the funded municipalities, municipal companies/social organizations, and private companies, as well as supplementary stakeholder interviews.

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## 2 EBS NWG Program in 2019

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In 2019, the funding programs for energy-efficient building and renovation (EBS NWG) for commercially used buildings (KfW 276/277/278), for municipal buildings IKK (KfW 217/218), and buildings of municipal enterprises and social organizations IKU (KfW 219/220) were continued without any adjustments from 2018.

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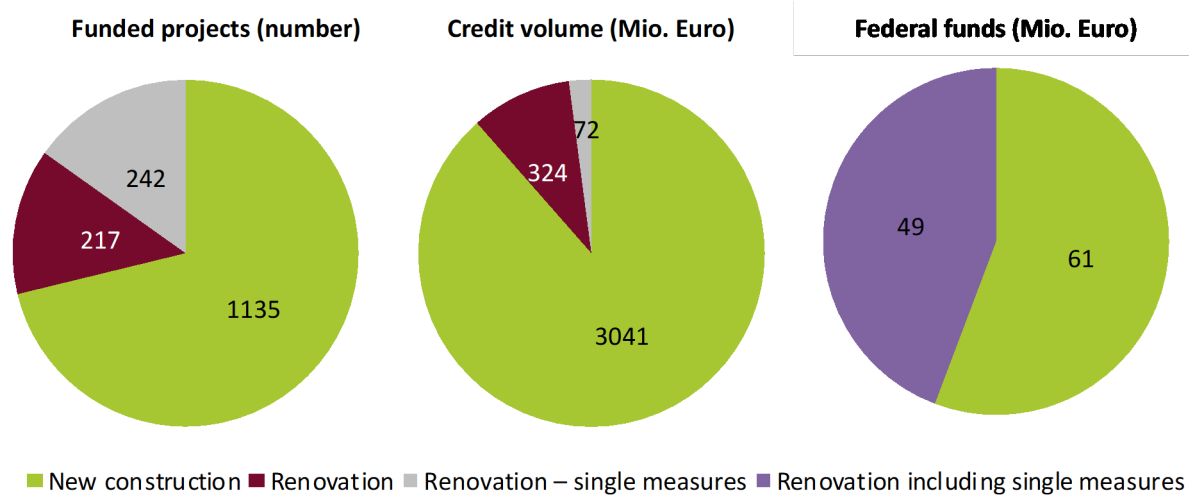
## 3 Funding Overview in 2019

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The funding year 2019 includes approximately 1,600 funded projects (funding cases), with new construction projects accounting for the largest share with about 70 % (see Figure 1). The rest is evenly distributed between renovations (14 %) and renovations with single measures (15 %). The number of

credit cases is 1,650. A total of 3.4 billion euros is generated in credit volume. The federal funds spent to enable interest rate reductions and to provide repayment subsidies amount to 110 million euros. This number does not include administrative costs. The investment volume is about 4.5 billion euros.

Figure 1: Funding balance sheet at a glance (2019)



Source: KfW funding data, own illustration.

The focus of demand is on the new construction and renovation of commercially used buildings (EEP: KfW 276/277/278). Around 90 % of the total credit volume is allocated to new construction and only 10 % to renovations. The IKK (KfW 217/218) funding programs have a total share of 12 % of the credit volume, which is mainly used for new construction. In the IKU funding program (KfW 220/219), with a total share of 8 % of the credit volume, new construction and renovation are roughly evenly distributed.

When the number of funding cases is considered in relation to the intended use, the majority of new buildings in the funding program (89 %) are aiming for the highest efficiency standard, namely the so-called KfW efficiency building 55. In the case of renovations, the highest funding standard, KfW efficiency building 70, is only aimed for in about half of the cases.

For private companies (EEP), the main types of use are administrative buildings as well as production and workshops. The highest demand among municipalities (IKK) is for schools and daycare centers. For municipal companies (IKU), demand is also highest for daycare centers. The funded single measures mostly consist of insulation, measures on windows, doors, and gates, as well as heat and cold generation. Renovations with single measures are characterized by technology combinations.

Of those who received funding in 2019, a total of 54 % were located in rural areas. The regional focus of funded new construction and renovation activities is in Baden-Württemberg and Bavaria. Generally, demand is greater in western German states than in eastern ones.

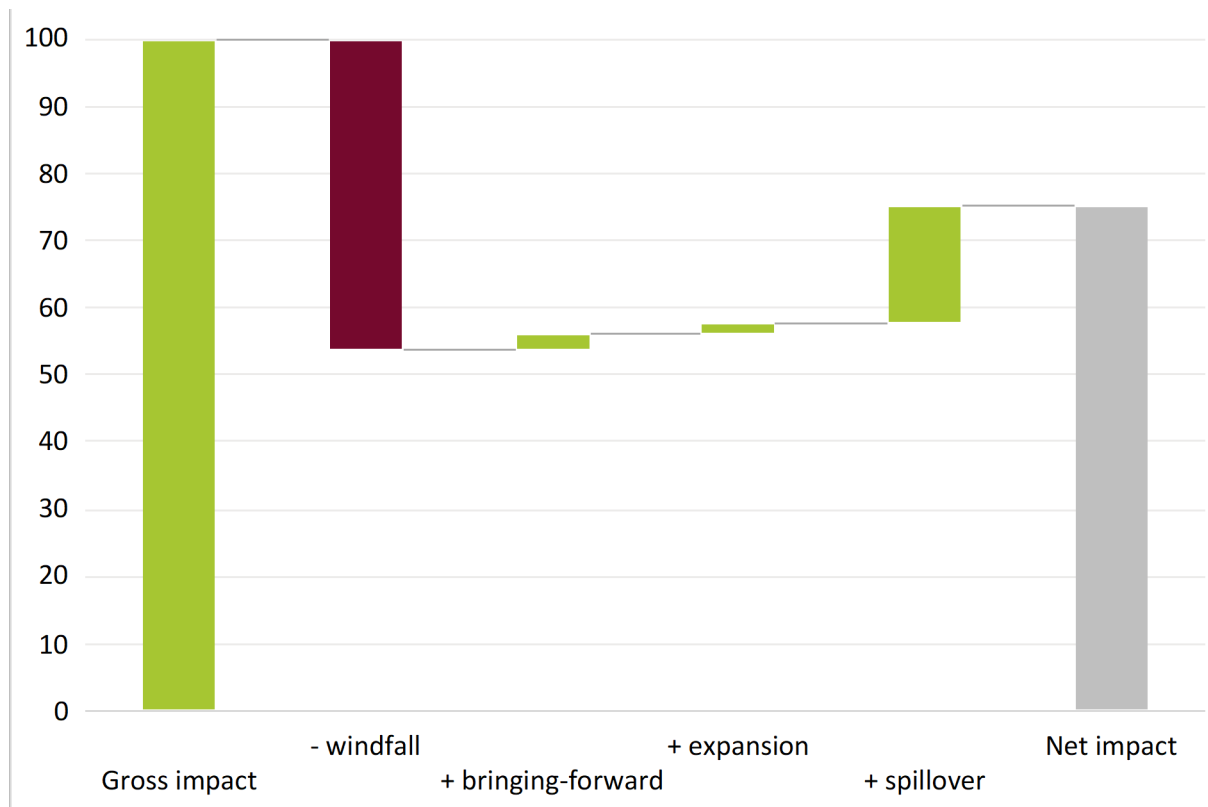
## 4 Effect Adjustment

The data in the funding statistics of KfW should be considered as gross values which need to be adjusted for windfall effects, bringing-forward effects, expansion effects, and transfer effects. The

method used to determine the size of these effects is generally based on the methodological guidelines (Fraunhofer-Institut für System- und Innovationsforschung ISI u. a. 2020). Data to adjust for these effects is based on the responses of the funding recipients in the online survey.

For projects that received funding approval in 2019, the gross funding impact (“Bruttowirkung”) is reduced by 25 %. This value represents a weighted average based on the proportion of each funding program among the participants in the online survey. The adjustment for these effects is shown graphically in Figure 2. A windfall effect (“Mitnahme”) of around 47 % is partially offset by a “bringing-forward-effect” (“Vorzieht”) of 3 %, an expansion effect (“Ausweitung”) of 1 %, and a spillover effect (“Übertragung”) of 18 %.

Figure 2: Overview effect adjustment (2019)



Source: Own calculations; N = 344.

The programs directed towards municipalities are characterized by a lower net effect than the programs directed towards municipal companies, social organizations, and private companies. This can primarily be explained by a significantly higher windfall effect (“Mitnahmeeffekt”). According to the online survey, the IKK programs (KfW 217 and KfW 218) have the lowest net effects at 61 %, while the IKU program (KfW 219) has the highest net effect at 87 %.

## 5 Target Achievement Control

The aim of the EBS NWG funding programs is to achieve goals such as saving primary and final energy, reducing greenhouse gas emissions, as well as securing or creating jobs and supporting small and

medium-sized enterprises. The client defines the target values to be assumed for target achievement control in the evaluation's performance description, however, only for the general Energy-Efficient Construction and Renovation (EBS) programs which includes programs for both residential buildings and non-residential buildings. Accordingly, the EBS programs target:

- Annual primary energy savings of 8.1 PJ,
- Annual final energy savings of 5.8 PJ,
- Annual greenhouse gas savings of 580,000 t CO<sub>2</sub> equivalents,
- As well as securing or creating 340,000 jobs.

The target values refer to gross figures.

With the 2019 funding year, a total of around 256 GWh of final energy savings or 299 GWh of primary energy savings are achieved annually. This results in an annual reduction of emissions of around 80,000 tons of CO<sub>2</sub> equivalents. The contributions that non-residential building funding makes to achieving the goals of the entire building renovation program range between 13 % and 16 % (see Table 1). Together with the effects achieved by funding residential buildings, the goals can be considered to have been achieved. Nevertheless, it is recommended to differentiate future energy-saving targets for funding programs in the building sector for residential and non-residential building areas.

Table 1: Contribution to Target Achievement (2019)

Target Parameter	2019		
	Achieved Value	Target Value	Contribution to Target Achievement
	PJ	PJ	%
Final energy savings	0.9	5.8	16
Primary energy savings	1.1	8.1	13
	Achieved Value	Target Value	Contribution to Target Achievement
	t CO <sub>2</sub> equivalents	t CO <sub>2</sub> equivalents	%
Greenhouse gas savings	79,782	580,000	14
	Achieved Value	Target Value	Contribution to Target Achievement
	Count	Count	%
Jobs saved or created	49,421	340,000	15

Note: Totals may differ due to rounding.

Source: KfW funding statistics, own calculations.

In addition, new construction and renovation activities activated through the funding programs generated gross value-added effects of around 3.8 billion euros and secured or created approximately 49,000 (gross) full-time jobs.



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## 6 Impact Assessment

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To assess the causality of the effects of the EBS NWG programs in the funding year 2019, the evaluation mainly builds on the effect adjustment analyses in general and, in particular, the assessment of “windfall-effects”, i.e., to what extent measures would have been implemented without funding. The analyses show that overall, about 51 % of municipalities, 36 % of municipal companies and social organizations, and 36 % of private companies would have implemented the projects in the funding year 2019 to the same extent even without funding. In municipalities, the spillover effect is thus higher than in companies, mainly due to more institutionalized processes and task structures in the implementation of new and renovation measures in municipalities, especially compared to (smaller) companies.

Compared to the construction programs, there are expansion effects are mainly observed in the renovation programs, meaning more extensive measures were implemented than initially planned. The tendency seems to show that the expansion effects are more pronounced in the target group of (private) companies than in municipalities.

At the same time, a consistently high demand and acceptance among funding recipients lends further reason in favor of causality of the effects of the EBS NWG programs. In the funding year 2019, around 8% of the newly constructed usable area nationwide was funded by the EBS NWG. The proportion of renovation measures funded by the EBS NWG program in the average insulation rate<sup>1</sup> is about 3.3%. Furthermore, the accessibility of the programs is generally perceived as high among the surveyed borrowers. Also, from the perspective of borrowers, the cost-benefit ratio of using the funding programs is seen positively in the vast majority. In sum, they achieve an energy cost saving of around 815 million euros with the funded projects over their lifetime. Generally, little criticism is expressed about the design of the programs, and borrowers express high satisfaction with the implementation of the programs.

Regarding the question of the role of the renovation programs in a change of energy source, the proportion of heating technologies used shifted significantly in favor of heat pumps (from 3% to 35%) among respondents who changed their energy source during renovations. The usage of solar thermal systems and wood-fired heating systems also increased. It was further found that in 73% of cases where gas-fired heating was the primary heating source prior to renovations, it was replaced by heat pumps. Oil-fired heating systems were more commonly replaced by gas-fired heating systems (38%) or wood-fired heating systems (31%). Overall, 76% of respondents who originally used fossil fuels for heating switched to renewable energy sources after making the energy source change.

In expert interviews, the influence of external factors on target achievement and impact was considered low. Moreover, the evaluation showed that the EBS NWG funding programs generally contribute to an increase in knowledge about possible efficiency measures and that the efficiency building types and standards supported by the KfW have become established as a standard.

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<sup>1</sup> The national insulation rate is used as a proxy for the national renovation rate, for which no information for non-residential buildings exists.

The calculated funding leverage for the 2019 funding year is about 31, meaning that for each funding euro (federal funds), an additional 31 euros of investment are made by borrowers. For new construction projects, the leverage is almost six times higher (49) than for renovation projects (8). Additionally, the funding triggers (net) investments of around 3.4 billion euros. Taken together, these are significant indications of the causality of funding for the effects observed.

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## 7 Economic Efficiency Control

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According to the methodology guidelines, the most important indicator for economic efficiency control is the funding efficiency. For this, the federal funds expended are compared to the final energy and CO<sub>2</sub> savings achieved with the funding programs.

Around 436 euros of federal funds are required per MWh of final energy saved per year. Over the service life of the measures, this value is approximately 22 euros. For new buildings, about 402 euros of federal funds must be used per MWh per year (20 euros over the service life), and for renovations, about 490 euros (24 euros over the service life).

Regarding the CO<sub>2</sub> funding efficiency, it is estimated that approximately 1,400 euros per ton of CO<sub>2</sub> equivalents saved must be expended per year, or nearly 80 euros over the service life of the measures. For new buildings, the corresponding values are 1,250 euros (per year) and 73 euros (over the service life), and for renovations, 1,660 euros (per year) and 93 euros (over the service life).

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## 8 Summary Assessment

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In summary, the analysis of the theory/model of change of the EBS NWG funding programs in the 2019 funding year shows that the approach pursued to achieve the set goals is appropriate and the funding is theoretically causal for the impact. The goal of the funding programs is to provide an incentive to funding recipients (municipalities, municipal companies/social organizations, private companies) to renovate existing buildings to an efficiency building standard or carry out new constructions according to efficiency building standards by providing financing advantages through interest rate reductions for loans as well as repayment subsidies. The measures carried out should represent an improvement in energy efficiency compared to the status quo without the funding program, resulting in energy savings (energy policy objective) as well as savings in GHG emissions (climate policy objective). Additionally, the program has an economic policy objective and is intended to support value creation and employment in small and medium-sized enterprises through the implementation of measures. The analysis of the funding balance sheet and the resulting target achievement and impact assessment show that this approach is generally functional and appropriate. The 2019 funding year contributes between 13% and 16% to the goals defined for the EBS programs overall (i.e., residential and non-residential buildings).

As part of the evaluation, the potential for expansion effects of the original planning through funding, especially in the renovation sector and with private companies, became apparent. It is therefore worth discussing whether this program area or target group should be even more strongly addressed in the future. At the same time, regarding ways to increasing further the degree of target achievement of the

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EBS NWG programs, barriers to the use of the programs were identified, including insufficient financial incentives, especially in the renovation sector, as well as the investor-user dilemma.

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