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REPORT

Germany's Efficiency Funding

Financing Solutions for Efficient Residential Buildings by KfW Bank

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In cooperation with

energy efficiency COUNCIL

AHK

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About the partners

adelphi is a leading independent think tank and public policy consultancy focussing on climate, environment and development, with the mission to improve global governance through research, dialogue and consultation. adelphi has been commissioned by the German Federal Ministry for Economic Affairs and Climate Action (BMWK) to support the energy cooperation with Australia and New Zealand. This study has been funded by BMWK for the above-mentioned project.

The **German-Australian Chamber of Industry and Commerce** is an Australian non-profit organisation that supports German companies to build and extend their engagement with the Australian market.

The **Energy Efficiency Council** is an Australian not-for-profit membership association for businesses, universities, governments and NGOs. The Council aims to build a sophisticated market for energy management products and services that delivers healthy, comfortable buildings; productive, competitive businesses; and an affordable, reliable and sustainable energy system for Australia.

Background and Acknowledgments

Germany and Australia have been formally cooperating on energy since the establishment of the *Australia-Germany Energy and Resources Working Group* (ERWG) in 2017. In 2021, the cooperation was formalised into an Energy Partnership.

In 2019, a Sub Working Group on Energy Efficiency, led by Luke Menzel, CEO of the Energy Efficiency Council (EEC), and Christoph von Spesshardt, today Executive Director of the German-Australian Chamber of Industry and Commerce (AHK) was formed within that partnership. The Sub Working Group was established to strengthen cooperation of both countries in the area of energy efficiency and identify lessons-learned and best practices for the partner countries.

The Sub Working Group, led by the EEC, published a report on opportunities for cooperation in the building sector in June 2020. One of its recommendations was the production of an English language report on Germany's sophisticated financing system for residential energy efficiency upgrades that has been established by its KfW Bank. The aim of this report is to build literacy around German residential energy efficiency financing for interested Australian (and global) stakeholders to inform processes for implementing similar programmes. adelphi has been tasked by the Sub Working Group with leading the work on this report, supported by the EEC and the AHK. The report has been funded by the German Federal Ministry for Economic Affairs and Climate Action (BMWK).

To help identify the information needs of stakeholders in Australia, two roundtables with representatives from Australian financial institutions and policy makers have been held in December 2021.

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Summary

Efficiency First is one of the guiding principles of the Energy Transition in Germany and underscores the focus of policymakers to shift from fossil to renewable energies and to reduce unnecessary energy consumption. For this reason, the financing and funding of energy efficiency has a long history in Germany. As a pioneer in providing extensive funding for energy efficient renovation and new construction, the German government has generated over €400 billion in private investments in energy efficient measures since 2006.[1]

The basis for the funding is a robust regulatory framework for energy efficiency in buildings in Germany and the EU, which the German Government has been both "**demanding, promoting and informing**". The federal funding is part of a broader mix of regulation and regulatory instruments that work in lockstep. The building stock plays a fundamental role in both the EU's and Germany's plans to achieve climate neutrality by 2045 and 2050 respectively, and the funding has been used to initiate and facilitate renovation and energy efficient new construction of apartments and buildings. To turbocharge renovation rates and efficiency in new buildings, funding for energy efficiency upgrades was substantially increased in 2020 and has undergone significant restructuring in 2021. It is now available as the ***Federal Funding for Efficient Buildings*** **(BEG)** from the German KfW bank and the German Government Agency BAFA.

The BEG provides very attractive funding conditions for residential and non-residential buildings. For residential buildings, the funding is divided into three categories:

- **Consulting**, including mandatory consulting services of energy efficiency experts;
- **Entry-level funding** for individual measures, such as installing heat pumps;
- **Systemic measures** for renovating or constructing at Efficiency House standard.

Customers are free to choose the funding as low-interest loans with repayment subsidies or as direct investment grants. For a KfW loan, retail banks across Germany serve as the interface to customers, a fact which has several advantages, including the wide availability of the loan products. A central principle of the programme is that **the more ambitious the investment, the higher the available funding.** This means funding amounts increase if higher efficiency standards are achieved.

Key elements to understand the workings of the programme include:

- **The on-lending principle of the KfW** (see section 3.3), which entails the cooperation of the KfW with retail banks across Germany to get the BEG through loans to the applicants.
- **The Efficiency House standard** (see section 3.4) is the benchmark for the level of achieved energy savings defined in relation to the German Buildings Energy Act. Efficiency Houses define technical standards to be reached for different funding intensities. Efficiency House 40 is the most ambitious and

[1] BMWK 2020: Long-term renovation strategy. Source (in German)

requires buildings to consume only 40% of the primary energy demand of the reference building.

- **The individual renovation roadmap** (see section 4.3) is an easy-to-understand plan for renovating a property over up to 15 years in several steps to an Efficiency House.
- **The energy efficiency experts** (see section 4.3), whose participation is compulsory when applying for funding, have to undergo a certification process and are instrumental in advising funding applicants on measures as well as ensuring that quality standards are reached.

Outcomes of the scheme include the effective establishment of technical standards that exceed regulatory standards for renovation and new construction, the implementation of quality control through a broad network of dedicated energy efficiency experts and the development of an overall awareness for the financing and the ecosystem around it.

Despite the federal funding, however, the emissions reductions achieved in the German building sector have been limited, and emissions and energy consumption have stagnated, at a renovation rate of around 1% per year so far. This is mainly due to the fact that the majority of the available funding has been used for new construction, while major challenges remain for the existing building stock. Only 7% of residential buildings in Germany achieve the best efficiency standard today.

Still, the operation and administration of the funding has generated tangible results and some key success factors have been identified that can be useful for establishing similar programmes.

Overall success factors include areas such as the customer journey, the streamlining of quality management, the ecosystem of energy efficiency experts and the Efficiency House standard.

For policy makers, success factors range from embedding the funding into an ambitious regulatory framework to the need for sufficiently high funding rates to increase the utilisation of the programme.

Success Factors for Policy Makers

- Embed the funding into an ambitious regulatory framework.
- Continuously coordinate minimum efficiency requirements and support schemes, making sure that projects receiving funding significantly exceed existing minimum requirements.
- Create an attractive offering for customers, banks and the public budget to support long-term success.
- Establish attractively high funding rates from the beginning to increase the utilisation of the programme.
- Provide funding amounts that correspond to the ambition of the investment: the higher the energy saving, the higher the subsidy.
- Establish continuous monitoring of the funding to verify the economic effects and contribution to the climate targets.
- Provide funding for innovative technologies to support their uptake in the market.

Financial institutions involved in the administration of such funding should offer customers the flexibility to choose from a range of products as well as utilising a broad network of financing partners if possible.

Success Factors for Financial Institutions

- Provide customers with the flexibility to choose from a range of financial products.
- Offer the product at a broad network of financing partners through the on-lending model.

In light of ambitious climate targets, low renovation rates and the energy supply crisis brought on by Russia's war in Ukraine, the BEG will undergo some changes. Funding for new construction was already reduced in 2021 and might be further limited to shift the focus to increasing the impact on the existing building stock.

Contents

List of Figures and Tables

List of Abbreviations

BAFA	Federal Office for Economic Affairs and Export Control
BfEE	Federal Agency for Energy Efficiency (Bundesstelle für Energieeffizienz)
BEG	Federal Funding for Efficient Buildings
BMDV	Federal Ministry for Digital and Transport
BMWK	Federal Ministry for Economic Affairs and Climate Action
CO_2e	CO_2-equivalent
dena	German Energy Agency
EED	Energy Efficiency Directive
EPBD	Energy Performance of Buildings Directive
ESG	Energy Efficiency Strategy for Buildings
EU	European Union
GEG	Building Energy Act (Gebäudeenergiegesetz)
GWh	Gigawatt hour
iSFP	Individual renovation roadmap (Individueller Sanierungsfahrplan)
KfW	Credit Institute for Reconstruction (Kreditanstalt für Wiederaufbau)
KSG	Federal Climate Protection Act (Klimaschutzgesetz)
RE	Renewable Energy
t	tonnes
TWh	Terawatt hour

1 Outcomes

Dubbed "renovation turbo" by former German Federal Minister for Economic Affairs and Energy, Peter Altmaier, the Federal Government has regularly increased the funding budgets for efficiency in buildings over the past years. In 2021, a record amount of €18.4 billion in new grants was issued for efficiency renovation and construction.[2]

The improved funding conditions in 2020 and 2021 resulted in a significant increase in applications. 2020 saw a doubling in funding applications for new construction (93,000 applications), most of them being Efficiency House 55 standard, which has since been discontinued. Around 20,000 applications were made for more ambitious standards (Efficiency House 40 or 40 plus). For full scale renovation towards an Efficiency House standard, around 20,000 applications were registered in total, up 80% from 2019.[3] Applications for both renovation and new construction increased again significantly in 2021, in total they were up 50%. Most of the increase came from surging applications for new construction, up to 159,000 applications. Applications for renovation to Efficiency House standard saw a moderate increase by 16.5% compared to 2020. Compared to 2019, the applications for individual measures decreased slightly in the following years.[4]

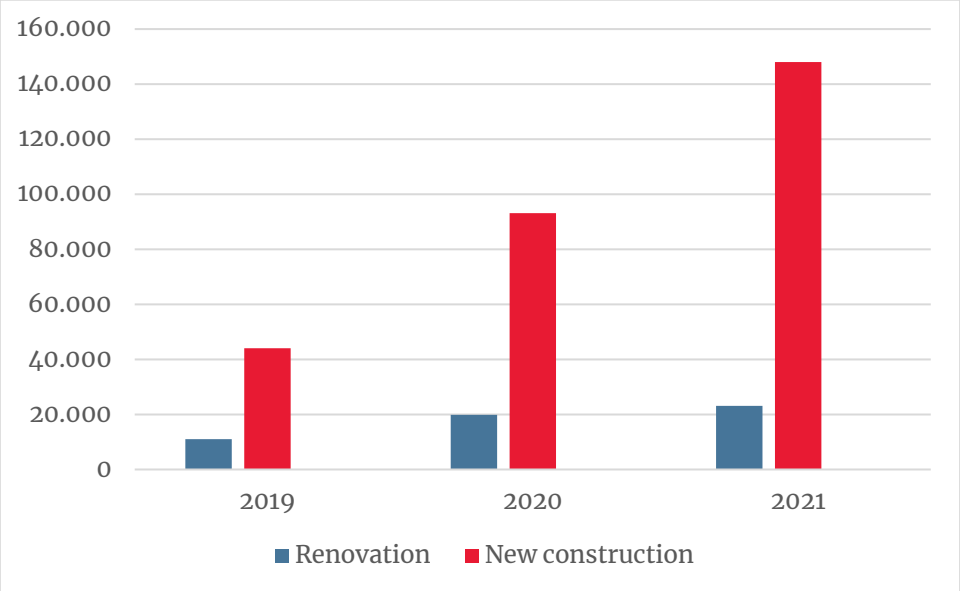


Figure 1: Succesful applications for BEG Funding through the KfW[5]

[2] German Federal Government 2021: More money for energy efficient buildings. Source (in German) & Baulinks 2021: Increase in federal funding for efficient buildings (BEG). Source (in German)

[3] German Energy Agency (dena) 2022: Report on Buildings. Source (in German)

[4] KfW 2021: Funding Report 2021. Source (in German)

[5] KfW Funding Reports 2019-2021. Source (in German)

These figures correspond to the total funding amounts granted through the KfW as estimated by the Deutsche Umwelthilfe in 2022[6]:

	Renovation	New construction
2019	≈ € 500 Mio.	≈ € 600 Mio.
2020	≈ € 1,000 Mio.	≈ € 3,800 Mio.
2021	≈ € 2,600 Mio.	≈ € 8,000 Mio.

Overall, the goal of the German Government is to provide incentives that would encourage funding recipients to go beyond the legal minimum standards. The increase in funding requests show that this aim has been successful over the past years. Positive results of the long-established federal funding programme also include the building of awareness around the positive effects of energy efficiency in buildings, helping to broadly establish the Efficiency House 55 as standard for new construction, which is higher than current legal German minimum requirements. Additionally, the funding has provided important incentives for the switching of heating fuels to renewables. What's more, it had knock-on effects by creating new jobs and intensifying the focus on energy efficiency such as, for example, the education of architects regarding this topic.

Achieved energy and CO_2 emissions savings for the implemented measures are not monitored by the German Government and therefore the data is not available. Nevertheless, over the past years, regular monitoring reports have been commissioned that have quantified both energy and CO_2 emissions savings by means of questionnaires sent out to a sample of funding recipients in each year. For the last year with an available monitoring report (2017), the achieved primary energy saving for the predecessor funding programme of the BEG was estimated to be around 2,020 GWh per year, a meagre amount compared to the total German primary energy demand of around 3,800 TWh.[7] The reduction of greenhouse gas emissions was estimated to be 620,000 t CO_2 per year. In terms of employment effects, the funding was estimated to have had employment effects amounting to 435,000 person-years.[8]

Overall, even though the BEG funding has had a very positive effect on energy efficiency in buildings and is generally seen as a success story, its effect on renovation rates and achieving emission reductions in the building sector has been very limited. Over the past years, the funding was largely used for new construction, and only 7% of residential buildings in Germany achieve the best efficiency

[6] Figures are taken from a graph of Deutsche Umwelthilfe 2022 : Funding check. Source (in German)

[7] German Environment Agency (2022): Primary energy consumption. Source (in German)

[8] IWU 2018: Monitoring of the KfW programmes « Energy efficient renovation » and « Energy efficient construction » 2017. Source (in German)

standard.[9] Since 2012, 60% of the funding budget has gone into new construction, although this only makes up 5% of the building stock. This imbalance has led to limited effects for the existing building stock.[10]

Implementing energy efficient renovations and new constructions in order to reduce emissions and save resources and costs should be a no-brainer nowadays - yet it is not, due to several issues. The lack of investment security has to be mentioned due to several changes in the funding conditions, which even included the complete funding stop, as experienced at the beginning of 2021. However, especially in geopolitical and economically uncertain times, investment security is essential and should be improved through stable funding conditions. Moreover, the persistent shortage of skilled professionals in Germany, ranging from engineers to roofers, which cannot be remedied in the short and medium term, also hinders the implementation of energy efficient buildings. This goes hand in hand with the scarcity of resources and concomitant price increases. New research also shows, that the effect of renovation is massively underestimated by home owners.[11]

Several policy developments are set to put increasing pressure on the German building sector. The German Government's climate targets mean that almost every building will need to be climate neutral by 2045. This is closely intertwined with the ambitious plans at EU level where several policy developments are underway pertaining to the buildings sector. The new draft of the Energy Performance of Buildings Directive (EPBD) would mean that - if adopted - the worst performing buildings in the EU Member States will need to reach better performances by 2030. The German Government is planning to introduce the Efficiency House 55 as the legal minimum requirement for new construction from 2023 onwards. A reform of the Federal Funding for Efficient Buildings is announced to put the focus much more strongly on renovation.

Overall, the funding by the German Government has achieved plenty of tangible results over the past years and the system of channelling the funding, especially through the KfW, is well-tested and beneficial.

[9] Deutsche Umwelthilfe 2022 : Funding check. Source (in German)

[10] Ifeu 2022: End the Unbalance in Funding for Buildings. Source (in German)

[11] Tagesspiegel Background 14.6.2022: Energetic renovation is underestimated. Source (in German)

2 Regulatory Overview

2.1 Policy and Regulatory Framework

The KfW Bank's programmes on building energy efficiency sit within a policy and regulatory framework established by the EU and Germany. This section sets out the key pieces of legislation aimed at shaping the German construction market and increasing energy efficiency in the building stock.

The European Union

Buildings play a fundamental role in the European Union's plan to achieve climate neutrality by 2050. In fact, buildings are the largest energy consumer in Europe being responsible for approximately 40% of energy consumption and 36% of the greenhouse gas emissions. Currently, more than a third of EU's buildings are over 50 years old and mostly not energy efficient.[12]

In order to increase energy performance of buildings and decarbonise the building stock, the EU has established a legislative framework: The Energy Performance of Buildings Directive (EPBD). This directive promotes measures to help achieve the following targets:

- a highly energy efficient and decarbonised building stock by 2050;
- a stable environment for investment decisions;
- enabling consumers and businesses to make well-informed choices to save energy and money.

The EPBD was amended in 2018 and lists a wide range of measures including:

- **Zero-energy buildings**
  All buildings built after 2020 have to consume nearly zero energy. The energy has to be mainly from renewable sources.
- **Energy performance certificates and technical inspections**
  When selling or renting a building, energy performance certificates must be issued and inspection schedules for heating and air conditioning systems must be established.
- **Renovation strategies**
  EU countries need to develop long-term strategies aimed at decarbonising the building stock by 2050, indicating milestones for 2030, 2040 and 2050.
- **Efficiency comparison**
  Energy efficiency requirements must be comparable EU-wide, reviewed every five years and updated if necessary.

In addition to the EPBD, the commission launched its **Renovation Wave Initiative** as part of the **European Green Deal** in 2020. The main objective of the initiative is to at

[12] European Commission 2022: Energy performance of buildings directive. Source (in English)

least double the current renovation rates of both public and private buildings by 2030 and foster deep renovations using a number of legal, financial and support measures.[13] This also requires a revision of relevant legislation such as the EPBD, a process which was carried out in late 2021. The EU provides the legal framework for its member states, who have to convert the directives into national law.

An **EU regulation** has immediate effect in all member states. In contrast, EU member states have to transpose **EU directives** into national law for them to have an effect at the national level. The national measure must achieve the objectives of the directive and be implemented within a set timeframe.

Another component of the Green Deal is the *Sustainable Finance Action Plan* which contains the **EU taxonomy** as a classification system for environmentally sustainable economic activities. The taxonomy defines criteria for roughly 80 subsectors, including buildings, and therefore provides companies, investors and policymakers with definitions of the economic activities which are considered sustainable.[14]

Germany

Until the late 1970s, there were no legal requirements for energy-saving insulation of buildings in Germany. This changed in the context of external price shocks due to the oil crisis: the topic of energy consumption in buildings increasingly came into focus and led to the implementation of the Heat Insulation Ordinance in 1977. This ordinance was enacted to reduce energy consumption of buildings through targeted construction measures - and thus to reduce dependency on energy imports through lower consumption. Since then, Germany has undergone an energy transition, known as the *Energiewende*, which aims at replacing fossil and nuclear energy sources with renewable energy and using energy in an efficient and economical way.

Over time, *Efficiency First* has become one of the guiding principles of the Energiewende as policymakers have recognised the very significant investment in supply side infrastructure – including heating, electricity generation, transmission and distribution and storage – required to decarbonise the German energy system.

The *Efficiency First* principle seeks to minimise this cost; better managing consumption means less spending on supply side infrastructure is required. It applies to all areas in which energy is consumed: not only buildings, but also industry and transport.

The *Efficiency First* principle is also aligned with Germany's strong interest in reducing energy requirements and therefore dependency of foreign imports of energy. It therefore goes beyond saving energy and protecting the climate: *Efficiency First* also means risk management, security of supply and protection against price developments. This has become particularly salient against the backdrop of the Ukraine-Russia conflict.

[13] German Environment Agency (UBA) 2021: The European Commission's Renovation Wave Initiative for the Building Sector. Source (in English)

[14] European Commission 2022: EU taxonomy for sustainable activities. Source (in English)

Following its lead principle of *Efficiency First*, Germany has introduced a number of measures at federal level that directly address the issue of energy efficiency in buildings (see table below).

Table 1: Overview German Policy Framework

Measures	Content and objectives
National Action Plan for Energy Efficiency (NAPE, 2014)	Contains short-, medium- and long-term instruments and measures with which several sectors, including buildings, can save energy.
The Energy Efficiency Strategy for Buildings (ESG, 2015)	Overall **scenario-based strategy** for the building sector to achieve a nearly climate-neutral building stock by 2050. Follows a technology-open approach.
Energy Efficiency Strategy 2050 (Energieeffizienzstrategie 2050, 2019)	Sets a concrete national energy efficiency target for 2030 and bundles a large number of efficiency measures for 2021-2030 in the new National Action Plan on Energy Efficiency (**NAPE 2.0**). Initiates a broad-based **stakeholder process *Roadmap Energy Efficiency 2050*** to discuss cross-sectoral pathways.
Federal Climate Protection Act (KSG, 2019)	Sets legally binding climate targets and annually decreasing emission levels for various sectors, e.g. GHG emissions of the building sector are to be **reduced by 43%** from 2020 to 2030.
Long Term Renovation Strategy (LTRS, 2020)	Roadmap with measures and measurable progress indicators for achieving long-term climate targets and identify ways and incentives for the energy-efficient renovation of the national building stock.
Building Energy Act (GEG, 2020)	Replaces old legislation (e.g. German Energy Saving Ordinance, EnEV) and transposes the European EPBD into German law (process of transposing the EPBD 2018 still ongoing). Specifies energy requirements for heated or air-conditioned buildings.
Federal Funding for Energy Efficient Buildings (BEG, 2021)	Replaces existing funding programmes and provides funding for energy efficient construction and renovation of both residential and commercial buildings.

	Implemented by the **German Development Bank (KfW)** and the **Federal Office for Economic Affairs and Export Control (BAFA).** Part of the Energy Efficiency Strategy 2050.
CO_2 Pricing (2021)	National emissions trading system for fuels (e.g. petrol, diesel, heating oil, liquefied petroleum gas and natural gas) intended to **help reduce CO_2 emissions in the heating and transport sector**. Other fuels will gradually be included.

2.2 Market Overview of the German Building Sector

This section provides information on the structure, size and outlook of the German building market, as well as the key barriers and challenges for energy efficiency in the building sector.

Market and Building Stock Overview

Following the reunification, Germany experienced a building boom until the late 1990s. After that, the number of newly built housing units declined significantly. In urban areas, construction activity has been increasing since 2011.[15] Despite the investment-reducing effects of the COVID-19 pandemic, the volume of new construction and renovation measures grew by 4.6% in 2020.[16] It is expected to grow even further in coming years; it is anticipated the strong demand for residential buildings as well as high volumes of public construction will counterbalance relatively slow development in the commercial building sector.

With nearly 2.5 million employees and €444 billion in nominal construction volume in 2021, the construction industry is an important sector of the German economy. More than 10% of its GDP is spent on construction projects, while at the same time the construction industry generates more than 6% of total added value in Germany.[17]

At present, Germany counts about 21.7 million buildings (excl. industrial buildings) – roughly 18.9 million (87%) of which are residential and 2.7 million (13%) are non-residential.[18] A large proportion of residential buildings has been erected since the second World War; 26% of buildings were constructed before 1948 and around 13% before 1919. Around 64% of residential buildings were built before 1977 when the first technical minimum requirements for buildings were instated. Only around half of all residential buildings have insulation, and many less if only buildings constructed before 1978 are considered. The majority of buildings constructed after 2010 have insulation.[19]

[15] German Energy Agency (dena) 2019: Report on Buildings. Source (in German)

[16] Destatis 2021: Press release no. 250. Source (in German)

[17] BMWK 2022 : Building Sector. Source (in German)

[18] German Energy Agency (dena) 2019: Report on Buildings. Source (in German)

[19] BMWK 2020: Long-term renovation strategy of the Federal Government. Source (in German)

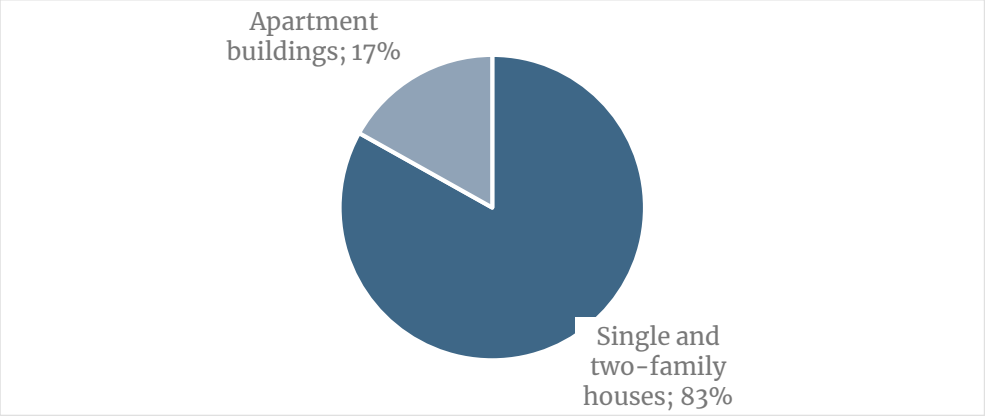


Figure 2: Residential Building Stock in Germany[20]

Over 70% of residential buildings have oil or gas-based heating systems, 22% of the residential heating consumption is covered by emission-intensive oil. District heating is also an important source (especially in the eastern states). Electric heat pumps have been gaining market shares in recent years. Around 40% of heating systems are older than 20 years and nearly 25% are older than 25 years, with the average age of heating systems at 17 years.[21]

The German building stock consumed 855 TWh of final energy in 2019, which accounted for approximately **35% of total German final energy consumption**. Most of the energy is consumed for heating, followed by smaller shares for hot water, lighting, cooling and other uses. Renewable energy has been contributing around 17% of final energy demand for heating and hot water in 2019.

40% of German greenhouse gas emissions are attributable to the building sector.[22] Although emissions in the building sector have declined since 1990, numbers have been stagnating for about a decade.

[20] German Energy Agency (dena) 2021: Report on Buildings. Source (in German)

[21] German Energy Agency (dena) 2022: Report on Buildings. Source (in German)

[22] Ibid.

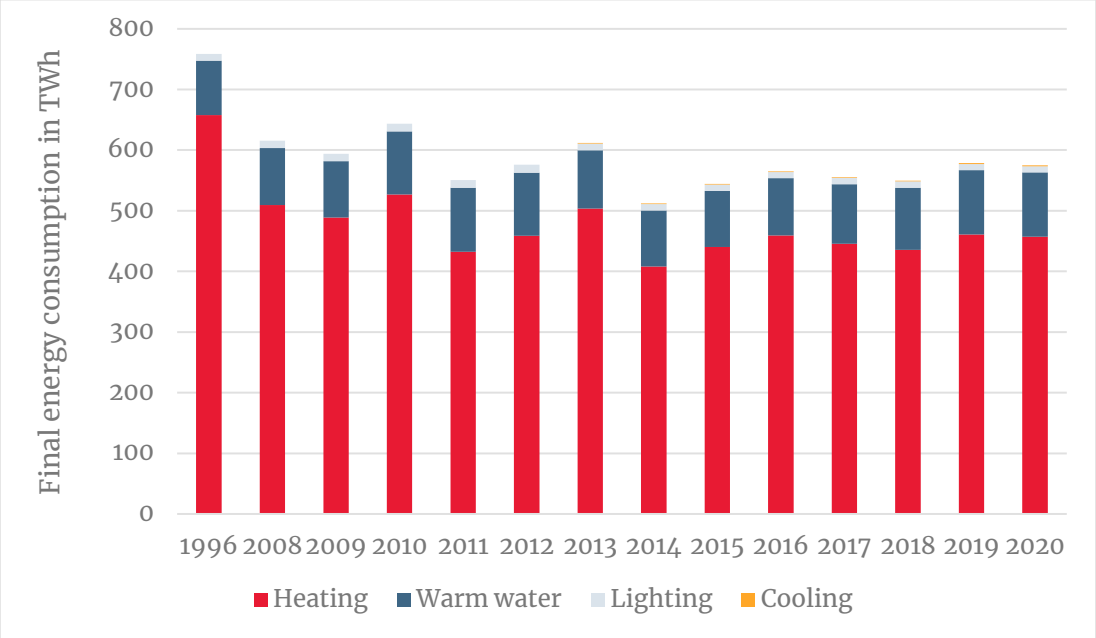


Figure 3: Development Final Energy Consumption in Residential Buildings[23]

Key Barriers

Although Germany has a long history of financing energy efficiency measures in buildings, the **low renovation rate** is still the most prominent barrier in Germany's building sector. However, the **increased funding opportunities** through the restructuring of the BEG have already boosted the renovation rate (16.5% increase in funding applications for renovation in 2021 compared to the year before) and will continue to do so in the future. Additionally, the **national CO_2-price** on fossil fuels will increase pressure on homeowners to increase **energy efficiency and the uptake of** electricity-based technologies.

Generally, there is an awareness about the benefits of energy efficient buildings in Germany, rooted in its perceived importance for a successful energy transition on the one hand and constantly increasing utility costs on the other hand.[24] This awareness has even intensified during the pandemic.[25]

[23] BMWK 2020: Energy data. Source (in German)

[24] German Energy Agency (dena) 2016 : Survey Energy Efficiency Building Sector. Source (in German)

[25] KfW 2021 : KfW-Energy Transition Barometer 2021. Source (in German)

3 Short History and KfW Financing Scheme

3.1 Short History of Energy Efficiency Financing

1990 - 2009

Energy efficiency financing has a long history in Germany. First funding programmes aimed at increasing energy efficiency have been available since 1990 through the KfW bank. The German government has been subsidizing the long running ***CO_2 Buildings Renovation Programme*** (CO_2-Gebäudesanierungs-programm) by the KfW with federal budget since 2001. The funding amounts increased steadily over the following years and the low-interest loan products were extended by a grant component in 2007.[26]

The **KfW** is one of the leading global promotional banks committed to improving economic, social and environmental conditions in Germany and abroad. It was established in 1948 as the "Kreditanstalt für Wiederaufbau" (Credit Institute for Reconstruction) to help finance the reconstruction of war-torn Germany. The Federal Republic of Germany is its main shareholder holding 80% and is liable for all of the KfW's liabilities and loans, the remaining 20% are owned by the federal states. The bank is headquartered in Frankfurt am Main and has offices in more than 80 cities around the world. The KfW is not a customer-facing bank and does not have any branches or customer deposits, all financing is done through retail banks. In 2020, the KfW provided funds amounting to €135 billion.

2009 – 2019

A larger restructuring occurred in 2009, when the existing programmes were tailored to the two main programmes ***Energy Efficient Construction*** and ***Energy Efficient Renovation*** that ran until the introduction of the ***Federal Funding for Efficient Buildings*** (BEG) in 2021.

2019 – 2021

While CO_2 reduction was an important rationale for these programmes from the beginning, they were also aimed at reducing overall energy consumption of the German building stock to reduce import dependency of the net importing German state. But with stalling emission reductions in the buildings sector over the last years, climate protection moved to the forefront with the ***Federal Climate Protection Act*** (Klimaschutzgesetz, KSG) in 2019 legislating a reduction target of 43% until 2030 for buildings.

To implement the funding programmes, BMWK has mandated two organisations: the German **KfW bank** and the **Federal Office for Economic Affairs and Export Control** (**BAFA**). See the box for some background on the KfW. BAFA on the other side is a federal authority subordinated to the BMWK and performs administrative tasks in the areas of trade, economic promotion, energy and supervision of auditors.[27] The KfW has been tasked with the implementation of the energy efficiency funding

[26] BMUV 2007: Federal government provides an additional 160 million euros annually for refurbishment in the building sector. Source (in German)

[27] BAFA 2022: Tasks. Source (in German)

programmes right from the beginning in the 1990s while BAFA has just started implementing grants for individual measures within the BEG in January 2021 (though BAFA has a long tradition of funding renewable heating sources in buildings).

2021 - 2022

The energy efficiency funding for buildings has undergone a significant restructuring and pooling in 2021. The Federal Government announced the decision to make subsidies for buildings more attractive in the Climate Protection Programme 2030 that was adopted in October 2019. Funding conditions under the existing programmes were improved as of 2020. From 2021, the **Federal Funding for Efficient Buildings (BEG)** was established as the new funding programme and directed to include measures to increase energy efficiency in buildings as well as measures to increase the use of renewable energies in buildings. The introduction of the BEG was accompanied by a further improvement in funding conditions. These changes should contribute to achieving the emission reduction targets in the building sector.[28]

From 2022 onwards

After the new German government took the helm in the autumn of 2021, the BEG experienced a couple of tumultuous months. After the amount of funding requested exceeded the available budget for the BEG, the BMWK and the KfW announced an immediate stop to funding applications in early 2022.[29] As a consequence, the funding for new construction at Efficiency House standard 55 (see **section 3.4**) came to a slightly earlier than planned end. Efficiency House standard 55 is planned to be established as the minimum standard for new buildings, which in practice it has largely become already. After reaching agreement within the government, funding for renovation has been continued for all Efficiency House standards at the previous conditions. Funding for new construction is now limited to the most ambitious Efficiency House standard 40 with lowered funding rates in 2022 and is planned to be overhauled for new construction from 2023 onward.[30]

3.2 Roles and Responsibilities of BMWK, KfW and BAFA

The **German Federal Ministry for Economic Affairs and Climate Action** (BMWK) is providing the framework conditions and is responsible for policy and design of funding instruments regarding energy efficiency in the building sector. Together with other Federal Ministries, BMWK implements regulations, sets targets, introduces instruments in the building sector and commits funding to support implementation of the targets.

As funding volumes from the federal government increased over time, so did the importance of BMWK in the design of the programmes. The reform of the funding

[28] The funding standards were initially tested in model projects for various building options such as non-residential and residential buildings or hotels, offering attractive above-standard grants for participants for energy efficient renovations using renewable energies, a stronger focus on primary energy demand and more flexible thermal insulation requirements. KfW Model Projects. Source (in German)

[29] BMWK 2022: KfW funding for energy efficient buildings temporarily halted. Source (in German)

[30] BMWK 2022: Solution for KfW funding for buildings in place. Source (in German)

and establishment of the BEG was driven by the German government and their decision to make the funding more attractive and less complex as well as achieving better energy efficiency and increasing the share of renewable energies.

KfW and BAFA are the implementing organisations for the BEG. In contrast to BAFA, which has only started implementing part of the BEG in 2021, the KfW has been tasked with the implementation of funding energy efficiency in the buildings sector from the first promotional programme in 1996. Throughout the past decades, the KfW has built up significant know-how. Experts from the KfW were instrumental in establishing the Efficiency House standard in the late 2000s.

Today, KfW and BAFA have been commissioned by the BMWK to implement the programmes and receive the budget funds, including budget for investment grants as well as for repayment subsidies. BMWK defines the objectives of the programme, sets the financial framework and reviews, and monitors the success of the programme at regular intervals. If necessary, certain modules are adjusted as a result.

3.3 KfW's On-Lending Principle

Since KfW is not a customer-facing bank and has no interface with the customer[31], it cooperates with **retail banks** across Germany to deliver the BEG funding to the customers through loans. Called *on-lending*, retail banks act as intermediaries between the KfW and applicants.

In practice, the KfW concludes a refinancing agreement with the retail banks and forwards the funds made available by the BMWK. The KfW also procures the remaining liquidity on the capital market at favourable interest rates. Retail banks are responsible for assessing creditworthiness of the customer, entering into the loan agreement and assuming the entire default risk of the loan. In return, retail banks earn an implementation margin when selling the KfW loans.

There are several advantages to this on-lending principle. For one, the availability of the KfW products at retail banks means that the products are available basically everywhere. Since the KfW assumes no credit default risk with the products and has ideal refinancing conditions on the capital markets, they can offer very attractive conditions for their products – in addition to the subsidies coming out of the federal funding. All incentives for the different stakeholders are summarised in section 4.4. On the other side, this set up also means that the KfW, and by extension the federal government, have no direct interface with the customers. No clearinghouse is involved in the transaction.

The retail banks are the financing institutions that have direct contact with applicants. They are mainly responsible for managing promotional loans, which entails checking creditworthiness, filing the loan application and crediting the respective funding amount to the applicant. The retail banks provide feedback collected from the customers but have no influence on the funding products.

[31] Except for municipal applicants

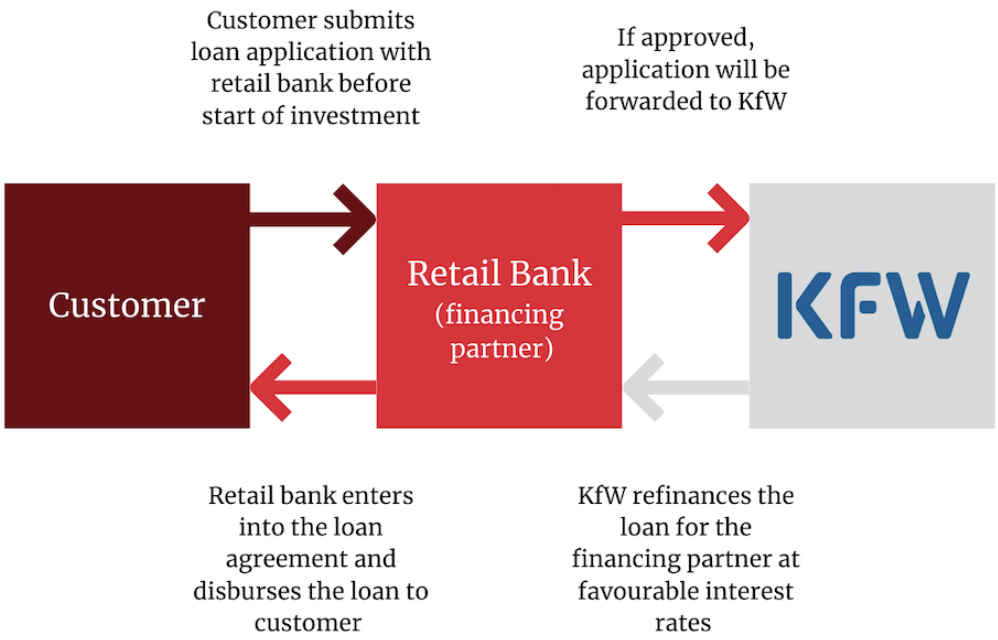


Figure 4: On-Lending Principle in Practice[32]

3.4 Efficiency House Standard

The term ***Efficiency House*** (Effizienzhaus) was developed as a benchmark for the level of achieved energy savings in buildings by the KfW together with the then German Federal Ministry for Digital and Transport and the German Energy Agency (dena). It stands for a high energy efficiency in buildings and lower emissions.[33] There are different standards for Efficiency Houses, ranging from Efficiency House 100 to 40.

These standards were developed in line with general standards defined by the ***German Buildings Energy Act*** (GEG) for new constructions as well as for existing buildings since 2020. The Act considers a building's geometry and installation engineering to individually determine its maximum rate of transmission heat loss and primary energy consumption.[34] These minimum requirements of energy efficiency based on the GEG serve as a reference for the Efficiency House standards. In practice, this means that the different levels of Efficiency Houses are compared to a fictional reference house based on the GEG minimum standards: therefore, to reach Efficiency House standard 55, a new or renovated building can only consume

[32] KfW 2018: KfW promotional programmes for energy efficiency in buildings. Source (in English)

[33] Das Haus 2022: KfW Efficiency Houses in comparison. Source (in German)

[34] BMWK 2022: Efficiency House standard for new construction. Source (in German)

55% of primary energy and have 70% of transmission heat loss of the reference building. The use of these two parameters is based on its interplay: the maximal primary energy demand can be achieved through the use of renewable energy and therefore the limitation in transmission heat loss is to ensure that even a building heated entirely with renewable energy is built efficiently, as well.[35]

Efficiency House standards apply for renovation of existing buildings or new construction. The following table summarises the different Efficiency House standards.

Table 2: Efficiency House Standards[36]

Efficiency House	Primary energy demand	Transmission heat loss	Applicability
40 / 40 Renewable Energy (RE) / 40 Sustainability	40%	55%	○ For new buildings (40 Sustainability) ○ For existing buildings (only 40 and RE standards achievable)
55 / 55 RE	55%	70%	○ For existing buildings
70 / 70 RE	70%	85%	○ For existing buildings
85 / 85 RE	85%	100%	○ For existing buildings
100 / 100 RE	100%	115%	○ For existing buildings

As shown in more detail in **Table 4**, one can note that the KfW funding only aims to encourage ambitious energy efficiency in buildings and therefore does not fund new building projects which simply deliver the GEG minimum standards or a little more. To receive funding, a newly-constructed building had to serve the standards of Efficiency House 40 since the beginning of 2022. Slightly different rules apply to existing properties: Renovations can be financially supported if this brings the building at least to the efficiency levels of the reference building (which equals Efficiency House 100).

Due to the above-mentioned consideration of the complete building geometry and installed heating systems, the primary energy consumption as well as transmission heat loss of a building depends on many parameters. The average transmission heat

[35] Energy efficiency experts 2021: Efficiency House 40. Source (in German) & Bundesanzeiger 2021: Directive for the Federal Funding for Efficient Buildings. Source (in German)

[36] Energy efficiency experts 2021: Efficiency House 40. Source (in German) & Bundesanzeiger 2021: Directive for the Federal Funding for Efficient Buildings. Source (in German) & BMWK 2022: Program overview. Source (in German)

loss of a single-family building serving the minimum GEG standards (Efficiency House 100) is around 0.37 W/m²K. Its average primary energy consumption amounts to around 72 kWh/(m²a).[37] Hence, the maximal loss for an average single-family building serving the Efficiency House 55 standards amounts on 0,26 W/ m²K, whereas the primary energy consumption adds up to 39,5 kWh/(m²a).

The Renewable Energy (RE) and Sustainability standards[38] are aimed at providing even higher incentives for the use of RE and for sustainability. The RE standard can be achieved by renovated if renewable energy sources provide a share of at least 55% of energy required to supply the buildings with heating and cooling. The sustainability standard is now a prerequisite for new buildings and requires official certification with the *Sustainable Building Quality Seal* (Qualitätssiegel nachhaltiges Gebäude). All RE standards increase the funding rate by 5% compared to the baseline for renovation.[39] In addition to the standards outlined in the table above, there is also a separate Efficiency House for heritage buildings that has simplified technical requirements.[40]

Customers are free to choose the specific measures with which to achieve the Efficiency House standards but have to involve an energy efficiency expert, who ensures the technical minimum standards are met. More information on the tasks of the energy efficiency experts can be found in **section 4.3**.

[37] Gebäudeenergiegesetz 2020: Source (in German)

[38] RE and Sustainability standards have been introduced in the restructured BEG in 2021.

[39] BMWK 2021: New Federal funding for efficient buildings (BEG). Note that these bonuses are non-cumulative. Source (in German)

[40] Das Haus 2022: Heritage Buildings. Source (in German)

4 BEG Funding

4.1 Overview of BEG

The *Federal Funding for Efficient Buildings* (BEG) is a funding programme of the German federal government for subsidising energy efficient new construction as well as renovation. Overall, the German building sector is mandated to reduce greenhouse gas emissions by over 40% to 67 Mio. tonnes (t) of CO_2e by 2030.[41] To help achieve this target, the BEG offers very attractive conditions to boost renovation rates and incentivize energy efficient new construction as well as the use of renewable energy heating sources. In operation since 2021, the BEG bundles several funding programmes that had been existing before and improved funding conditions.[42]

The BEG consists of three different programmes including systemic measures for renovating or constructing at Efficiency House standard for residential and non-residential buildings as well as individual measures such as installation of heat pumps. This report focusses on residential buildings.

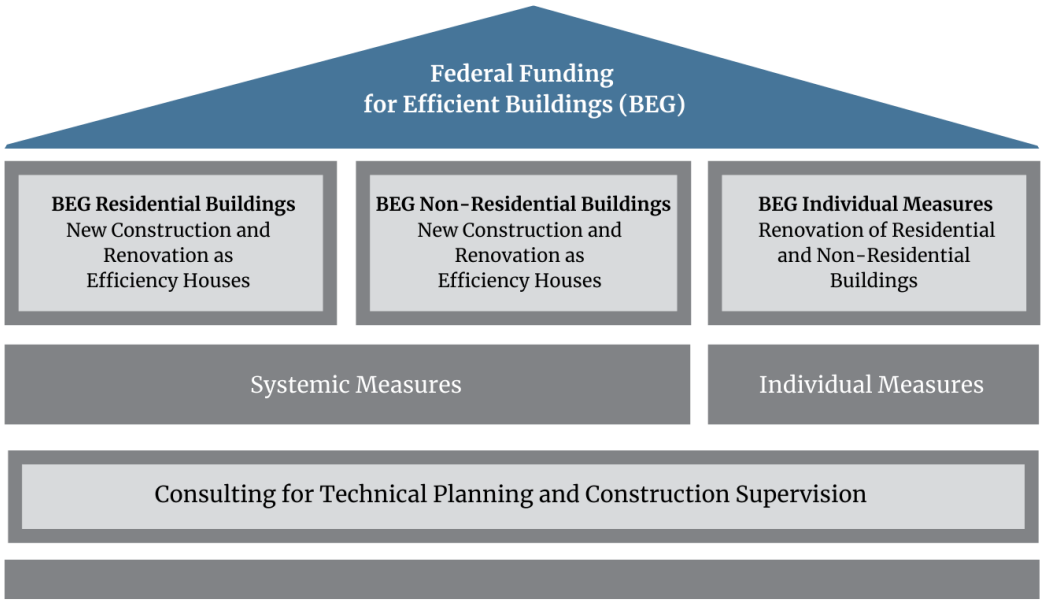


Figure 5: Structure of the Federal Funding for Efficient Buildings (BEG) [43]

[41] Bundesgesetzblatt 2021: First Act to amend the Federal Climate Protection Act. Source (in German)

[42] Including the Market Incentive Programme (MAP), the Incentive Program Energy Efficiency, the Heating Optimisation Programme and the CO2 Building Renovation Programme.

[43] BMWK 2022 : Structure of the BEG. Source (in German)

The funding is available as low-interest loans with repayment subsidies or as direct investment grants, where the customer is free to choose. The KfW and BAFA share the implementation of the programmes: BAFA is tasked with administering the investment grants for individual measures, while the KfW is responsible for administering all loans as well as grants for the systemic measures. BAFA will eventually take over the administration of all investment grants from the KfW. Private customers including owner associations, municipalities, businesses and non-profit organizations are eligible to apply for BEG funding.[44]

4.2 Scope and Area of Funding

The available funding programmes, which were designed in a modular fashion, can be categorised by their scope. The funding can be classified in the following way:

- **Consulting**: funding is available for qualified consulting services, including the services of the mandatory involvement of the energy efficiency experts (see section 4.3).
- **Entry-level funding**: easily accessible funding is available for individual measures that increase building efficiency or increase renewable energy usage, such as installing solar thermal heating or renovating the roof.
- **Systemic funding**: funding is available to update buildings to Efficiency Houses that reach the target levels for primary energy demand and transmission heat loss. It is also available for customers to build or buy a new Efficiency House.

The funding for consulting and systemic programmes is available for **both new and renovated buildings**.

The entry-level funding is only available for renovation since it targets the improvement of existing infrastructure.

For the renovation of existing buildings and construction of new buildings, the funding concentrates on measures that (1) reduce heating and cooling demand, (2) increase energy efficiency of the heating and cooling system and (3) integrate renewable energies. Funding is available for the following areas:

- **Building envelope** (insulation of walls, roof, basement, replacement of windows/doors, summer thermal insulation)
- **Technical systems – non-heating** (ventilation systems, *Efficiency Smart Home*)
- **Heating systems** (gas condensing boilers *Renewable Ready*, gas hybrid systems, solar thermal systems, heat pumps, biomass systems, exchange of oil heating, innovative heating systems, RE hybrid heating systems, heat

[44] Bundesanzeiger 2021: Directive for the Federal Funding for Efficient Buildings. Source (in German)

storage systems, connection to building/heating network, construction, conversion or extension of building network)

- **Heating system optimisation**
- **Technical planning and construction supervision**

Excluded from funding are heating systems based on fossil fuels (oil, coal, gas – if not hybrid or renewable-ready), sanitary facilities, administrative costs and others. A detailed overview of the eligible measures can be found online.[45]

4.3 Programmes in Detail

4.3.1 Consulting

Several funding opportunities are available for consulting services, including for the mandatory consultation of energy efficiency experts. Along with the improvements in funding conditions for renovation and new construction in 2020 and 2021, conditions for the funding of consultation services have also been improved, leading to a surge in applications.[46]

First of all, there are basic consultation services offered by consumer associations across Germany. Around 500 independent energy experts are available to provide a range of different services, including a basic check to give an initial assessment on energy consumption and appliances, a suitability check for heating consisting of an analysis of the current heating system and recommendations for updates, a building check including assessments on heating and building envelope and so forth. All of these services are either free of charge or require a very small fee.[47]

Secondly, there is the grant funding for energy advice for residential buildings provided by BAFA. This in-depth consultation results in a renovation concept or individual renovation roadmap (for which additional funding becomes available).

Thirdly, funding is available for the technical planning and construction supervision, which includes services of a certified energy efficiency expert to assist with all stages of the planning, construction or renovation of buildings.

[45] BMWK 2022: Information sheet on the eligible measures and services. Source (in German)

[46] German Energy Agency (dena) 2022: Report on Buildings. Source (in German)

[47] BMWK 2022: Getting started made easy: energy advice from the consumer associations. Source (in German)

Table 3: Funding for Consulting[48]

Funding product	Energy advice for existing, residential buildings	Technical planning and construction supervision for renovation & new construction
Offers from the consumers associations	Basic consultation services for free / a small fee	
Grants administered by BAFA	80% of the eligible costs ➢ Max. €1,300 for one- and two-family homes ➢ Max. €1,700 for residential buildings with more than two parties Results in a renovation concept or individual renovation roadmap (iSFP, see Spotlight).	50% of the eligible costs ➢ Max. €5,000 for one- and two-family homes ➢ Max. €2,000 for residential buildings with more than two parties ➢ Max. €20,000 per application
Loans with repayment subsidy administered by the KfW		50% of the eligible costs ➢ Max. €5,000 for one- and two-family homes ➢ Max. €2,000 for residential buildings with more than two parties Max. €20,000 per application

[48] BMWK 2022: Finding the right funding programme for home owners. Source (in German) & German Energy Agency (dena) 2021: Renovation funding for residential buildings. Source (in German)

Spotlight: The Individual Renovation Roadmap (iSFP)

The **individual renovation roadmap (iSFP)** is an easy-to-understand plan for the step-by-step renovation of a property on the way to an Efficiency House.[49] It can be used for single and two-family houses as well as apartment buildings.

Step 1 Initial consultation: During an on-site meeting, the energy efficiency expert and applicant work out individual wishes and needs with regard to the renovation. Non-energy-related measures can also be part of the consultation – whether remodelling for the elderly, expanding the living space or increasing comfort of living.

Step 2 Current energy status: The expert evaluates the entire building (primary energy) as well as individual building components.

In principle, any energy consultant can prepare an iSFP. However, if the applicant wishes to receive funding for the preparation of the iSFP, the energy consultant must be listed as an official **energy efficiency expert** (see section 4.3).

Step 3 Renovation proposals: The expert develops individual packages of concrete renovation measures. In addition, the applicant receives information on the process as well as the costs of the respective efficiency measures. The iSFP is **valid for a maximum of 15 years**. After that, applicants will not receive any extra funding for measures implemented.

Step 4 Individual renovation roadmap: The expert and applicant discuss the measures and the expert prepares the iSFP.

Step 5 Final consultation/meeting: After the detailed preparation of the iSFP, the applicant and expert discuss the final results. At the end of the consultation, applicants receive the following documents:

- "My refurbishment roadmap" – information on the current state of the building and the planned renovation steps.
- "Implementation guide for my measures" – detailed information on the individual renovation steps including the respective efficiency measures.

Step 6 Implementation: Before applicants implement a measure from their iSFP, they have to submit a grant application to KfW or BAFA, or a loan application to KfW. The energy efficiency expert confirms as part of the "confirmation of application" that they are implementing the respective measure in accordance with the iSFP. The applicant automatically receives an extra (repayment) grant of 5 percent once the measures have been implemented correctly.

Advantages of an iSFP

An iSFP has several advantages for applicants:

- **Overview:** applicants receive a detailed overview of the energy status of the house and step-by-step recommendations for the renovation
- **Individuality**: based on applicants' circumstances and needs

[49] KfW 2022: Der individuelle Sanierungsfahrplan (iSFP). Source (in German)

- **Flexibility:** all renovation measures can be planned in advance and coordinated with each other. The applicant does not have to carry out (and finance) all the measures "in one go".
- **Eligibility for funding:**
  - **80%** of the preparation costs are subsidised in the BEG (max. €1,300 for one- or two-family houses and €1,700 for residential buildings with three or more residential units).
  - For every measure from the renovation roadmap that is implemented, applicants receive an **extra 5%** on the grant or repayment subsidy from the KfW and BAFA (***iSFP bonus***).

4.3.2 Entry-Level Funding and Systematic Funding

The BEG portfolio includes different programmes and products that can be very much tailored to the customer's needs. Available are low-interest loans with repayment subsidies and direct investment grants that can be used to fund renovation or construction to different Efficiency House standards or individual measures. Some aspects of the loans can be tailored, such as tenor, interest-free years and early repayment. **In principle, the more ambitious the investment the higher the available funding.** This is an important incentive for customers to invest in measures with higher savings in primary energy demand and transmission heat loss.

Repayment subsidies and investment grants are disbursed after the completion of the investment. Conditions apply for the costs that are eligible for funding, partially different depending on the funding programme. Costs concerning the purchase of land and personal labour among others are excluded.[50] Funding is only possible for measures that have not been started at the time of the application for the funds.[51]

Besides residential buildings, which this report focuses on, there is also funding for commercial and municipalities available.

Loans with repayment subsidies for new construction and renovation

For residential buildings, there are two different loan products:

- **KfW 261** is the systemic funding for Efficiency Houses for building or buying a new efficient house or renovating an existing building to an efficient house. These include all different Efficiency House standards as outlined in section 3.4. Table 4 provides an overview of the funding conditions. The loan amount depends on the eligible costs, maximum loan amount is €150,000 for Efficiency House 40 RE or sustainability standards.[52]

[50] BMWK 2022: Information sheet on the eligible measures and services. Source (in German)

[51] KfW 2022: General Information sheet on the application. Source (in German)

[52] For comparison: In average, the price of building a single-family house (150 square meters living space) is 325,000 Euro in Germany (as of February 2022), excluding the price of property (great variation in prices depending on region). Due to the reversal of the VAT reduction, the increase in the price of building materials and their scarcity, the price of a new building is steadily increasing.

- **KfW 262** is the entry-level funding for a range of individual measures. These include different areas of funding as outlined in section 4.2. Table 5 provides an overview of the measures and funding rates that are possible. The loan amount depends on the eligible costs, maximum loan amount is €60,000 per unit and year.[53]

Loan type and periods

The customers can choose between annuity loans or bullet loans. With an annuity loan, the customer will pay only interest in the grace period (between one and five years) and then fixed annuities (interest and repayment) for the rest of the loan period. Bullet loan means that the customer only pays interest during the loan period and the loan amount in one sum at the end. Loan periods are flexible and range from four to ten years for the maturity loans and four to 30 years for the annuity loans.

Interest rates

The interest rate is fixed for the first ten years of the loan period, and in case of a bullet loan, for the entire period. After ten years, the KfW submits to the customer a prolongation offer for the interest rate, without an interest rate reduction from the federal funding. The annual interest rate is not much lower than interest offered elsewhere in the low-interest environment of the last years. In the past, the KfW products were available with interest rates that were noticeably lower than elsewhere. The annual interest rate offered to the customers consists of the refinancing interest rate (variable), the implementation margin of the retail bank, and an interest rate reduction individually determined according to the market situation and the programme component. While the loan conditions are attractive and flexible to customer's needs, the key argument for a KfW loan is the repayment subsidy.

Loan amount and repayment subsidy

The amount of loan granted depends on the Efficiency House standard of the building and the amount of eligible costs. With the achievement of the RE standard (see section 3.4) or with an individual renovation roadmap (iSFP, a plan for renovating the property over time in several steps to become an Efficiency House and which generates additional 5% on the funding rate, see section 4.3), the loan amounts and repayment subsidies increase for funding for Efficiency Houses. Table 4: Funding Conditions for Residential Efficiency Houses depicts the funding conditions for Efficiency Houses. The low-interest loans cannot be used to re-finance existing loans.

Payment and repayment

The loan can be disbursed either in a lump sum payment or in instalments and customers have 36 months after approval to have the loan paid out (with a

[53] KfW 2022: Information sheet BEG for residential buildings individual measures. Source (in German)

commitment fee payable from the 13th month onwards). The paid-out loan amounts need to be used for the specified purpose within 12 months. Early repayment is possible with an early repayment fee for the entire outstanding loan amount, partial repayments are not possible. After the end of the fixed interest period, the customer can repay in full or partially without additional charges. [54]

Investment grants for new construction and renovation

- **BAFA BEG EM:** offers the entry-level funding for a range of individual measures. These include different areas of funding, Table 5: Funding Overview for Individual Renovation Measures provides an overview of some of the products.[55]

- **KfW 461**: comprises the systemic funding for Efficiency Houses for building or buying a new efficient house or renovating an existing building to an efficient house. These include all different Efficiency House standards.[56]

Grant amounts are identical to the repayment subsidies available for the loan products.

[54] KfW 2022: Information sheet BEG for residential buildings loan individual measures. Source (in German) & KfW 2022 : Information sheet BEG residential buildings loan Efficiency House. Source (in German) & KfW 2022: Residential Buildings – Loans 261, 262. Source (in German)

[55] BAFA 2021: General information sheet for application. Source (in German)

[56] KfW 2022: Information sheet BEG for residential buildings grant Efficiency House. Source (in German)

Table 4: Funding Conditions for Residential Efficiency Houses[57]

Efficiency House standard	New Construction*		Renovation		
	Loan with repayment subsidy or grant		Loan with repayment subsidy or grant		
	Calculation	Max. amount	Calculation	Max. amount	Individual Renovation Roadmap (iSFP)
40 Sustainability	12.5% of max. €150,000 loan amount / eligible costs	€18,750			
40 Renewable Energy (RE)			50% of max. €150,000 loan amount / eligible costs	€75,000	+5%
40			45% of max. €120,000 loan amount / eligible costs	€54,000	+5%
55 RE			45% of max. €150,000 loan amount / eligible costs	€67,500	+5%
55			40% of max. €120,000 loan amount / eligible costs	€48,000	+5%
70 RE			40% of max. €150,000 loan amount / eligible costs	€60,000	+5%

[57] BMWK 2022: Federal funding for efficient buildings - residential buildings (BEG WG) - loan and grant. Source (in German)

70			35% of max. €120,000 loan amount / eligible costs	€42,000	+5%
85 RE			35% of max. €150,000 loan amount / eligible costs	€52,500	+5%
85			30% of max. €120,000 loan amount / eligible costs	€36,000	+5%
100 RE			32.5% of max. €150,000 loan amount / eligible costs	€48,750	+5%
100			27.5% of max. €120,000 loan amount / eligible costs	€33,000	+5%
Heritage EE			30% of max. €150,000 loan amount / eligible costs	€45,000	+5%
Heritage			25% of max. €120,000 loan amount / eligible costs	€30,000	+5%

Table 5: Funding Overview for Individual Renovation Measures[58]

Area	Measure	Funding rate	Funding rate with exchange of oil heater
Building envelope	➢ Insulation of walls, roof, basement, ceilings and floors ➢ Replacement of windows/doors ➢ Summer thermal insulation	20%	
Technical systems – non-heating	➢ Installation / replacement / optimisation of ventilation systems ➢ Installation of *Efficiency Smart Home*	20%	
Heating systems	➢ Gas condensing boilers *Renewable Ready* ➢ Gas hybrid systems ➢ Solar thermal systems ➢ Heat pumps ➢ Biomass systems ➢ Innovative heating systems ➢ Renewable energy (RE) hybrid heating systems	20% 30% 30% 35% 35% 35% 35%	 40% 45% 45% 45% 45%
Buildings network	➢ Construction, conversion, extension ○ 55% RE and/or waste heat ○ 75% RE and/or waste heat ➢ Connection to the buildings network ○ 25% RE and/or waste heat ○ 55% RE and/or waste heat	 30% 35% 30% 35%	 40% 45%

[58] BMWK 2022: Federal Funding for efficient buildings – individual measures (BEG EM). Source (in German)

Heating Network	➢ Connection to the heating network ○ 25% RE and/or waste heat, primary energy factor max. 0.6 ○ 55% RE and/or waste heat, primary energy factor max. 0.25	30% 35%	40% 45%
Heating optimisation	➢ E.g. hydraulic balancing with adjustment of heating curve or replacement of heating pump	20%	

Spotlight: Energy Efficiency Experts

Energy efficiency experts play a crucial role in energy efficiency financing of buildings. This section focusses on the energy consulting market, tasks and costs of energy efficiency experts and gives an overview of the accreditation process.

In order for applicants to qualify for BEG funding, the renovated or newly constructed building must meet technical minimum requirements. With higher levels of energy efficiency, the demands on the quality of the work to be carried out also increase. In the case of Efficiency Houses, even small errors in planning or execution can mean that the calculated savings in primary energy demand or transmission heat loss are not achieved, and therefore the grant or repayment subsidy is not paid.

To prevent such errors and ensure high quality of funded measures, qualified energy efficiency experts are mandatory when it comes to planning and implementing energy efficient renovations or new construction. They provide professional and independent advice before the start of the project and accompany the execution of energy efficiency measures during construction, thus ensuring professional implementation. They also help customers to identify the savings potential of their building and to make optimal use of federal funding for their building project.

The following is a compact summary of the typical tasks of an energy efficiency expert:[59]

- **Consultation before the application process and implementation**
- **Participation in construction meetings**
- **Contact person for questions about energy-efficient renovation** (Advice on renovation, subsidies, preparation of renovation roadmaps, concepts, etc.)
- **Confirmation of application** (Includes the results of the calculations on the energy saving and transmission heat loss savings based on visual inspection and reference values for the type of building)
- **Recording information on the trades** (Includes the phase of the start of construction; notes and recommendations on interfaces between the subcontractors as well as on the execution of the work)
- **Documentation during the renovation phase** (Photo documentation of the renovation progress; implementation status; comparison of services offered and carried out; scheduling of the next site inspection)
- **Recording of possible changes** (Unforeseen work; change requests by the client; support in finding solutions; documentation and review of changes)
- **Confirmation of implementation** (Summary of the renovation measure; obtaining invoices and subcontractor's declarations on the compliance with

[59] RENEWA 2022: The tasks of an energy advisor. Source (in German)

standards, checking the measures through visual inspection or suitable tests)

Energy consulting market

According to an analysis conducted by the Federal Agency for Energy Efficiency (Bundesstelle für Energieeffizienz, BfEE), the market volume of energy consulting on the energy services market amounted to around **400 million euros** in 2019.[60] The market volume of energy consulting is mainly influenced by the active energy consultants in Germany even though the actual number is very difficult to estimate due to the vaguely defined job description. The energy efficiency expert list serves as the basis for estimates and concludes that in 2019 there were **11,000 to 12,500 active energy efficiency experts** in Germany, the number of active experts has likely gone up due to the increased demand. The majority of their backgrounds fall into the following three categories: Architectural and civil engineering offices/energy consulting offices (80%), craft business (5-6%), energy supply company or municipal utility (6%).

Tasks: Step by step

1. The energy efficiency experts take stock of the current energy status of the property and determine its savings potential by comparing its actual state with the technical minimum standards of different Efficiency Houses.
2. On the basis of the inventory, the experts then propose how to eliminate weak points and provide an overview of costs.
3. Once applicants have decided on certain renovation measures, the energy efficiency experts start with the detailed energy planning. If necessary, they will also help checking the offers of subcontractors and assist with the application process.
4. In order to apply for funding, the energy efficiency experts have to submit a *confirmation of application* by logging in to the so-called EBS-Tool. This process was fully digitalized by the KfW.
5. As soon as the work starts, the energy efficiency experts supervise the construction progress to ensure the energy-saving potential is maximised and implementation errors are avoided.
6. After the construction has been completed, the experts compare the implemented measures with the technical requirements and forward the data to the retail bank and the KfW via the EBS-Tool (*confirmation after implementation*). Thereby, they confirm to the KfW that the aspired energy efficiency level is met so that applicants receive their repayment subsidy or grant.
7. In addition, some energy efficiency experts also show applicants how to properly heat and ventilate the property. In case of random in-depth checks

> Some applicants wish for the energy efficiency expert to submit the official application for funding. In this case, the expert is liable if errors occur during the application process.

[60] BfEE 2021: General market indicators. Source (in German and English)

by the KfW, the experts keep all documents from the construction process (such as the subcontractor declarations) as well as a detailed list of costs.

Costs and prices

Applicants do not have to pay for the services of the energy efficiency experts from their own pocket. They have access to funding, depending on the task the energy efficiency expert is entrusted with. If they take advantage of a KfW funding programme (i.e. one of the KfW loans 261 and 262 or the KfW grant 461), the mandatory involvement of a certified energy efficiency expert is partly funded. The services provided by the experts —and therefore expected costs —is based upon the measures to be implemented. The table below gives an overview over typical services and costs of energy efficiency experts.

Table 6: Overview of Services and Costs of Energy Efficiency Experts[61]

Service	Costs	Funding
Energy consultation	Approx. €1,000	**50%** BEG funding (BAFA or KfW)
Apply for funding	€350 – €650	**50%** BEG funding (BAFA or KfW)
On-site appointment	€350 – €450	**50%** BEG funding (BAFA or KfW)
Individual renovation roadmap (iSFP)	Approx. €1,700	**80%** (but **max. 1,300 euros**) BAFA programme *Energy consulting for residential buildings*
Comprehensive renovation concept (Sanierungskonzept)	€1,700 – €2,000	**50%** BEG funding (BAFA or KfW)
Energy certificate (demand)	€250 – €400	**50%** BEG funding (BAFA or KfW)
Energy certificate (consumption)	From €70	**50%** BEG funding (BAFA or KfW)
Blower-Door-Test	€500 – €700	**50%** BEG funding (BAFA or KfW)
Thermographic images	€300 – €500	**50%** BEG funding (BAFA or KfW)
Construction supervision	€400 – €600	**50%** BEG funding (BAFA or KfW)

[61] RENEWA 2022: Energy efficiency experts: Tasks, costs and funding. Source (in German)

How to find an energy efficiency expert

The professional title of *Energy Consultant* is not protected, meaning that basically anyone can act as an energy consultant and offer energy advice. If applicants want to apply for BEG funding, the involvement of an energy consultant with certification (*Energy Efficiency Expert*) is generally mandatory (see Table 7). This applies above all to renovations of the building envelope. In this case, only the energy efficiency expert is legally entitled to confirm any information to the funding institutions and issue the documents required for repayment of the funding. All experts can be found in the central expert list provided by the German Energy Agency (dena).

Many energy consultants are members of (regional) associations, a fact which has multiple advantages for them: As part of a network of energy consultants, they are in close contact with other professionals and can take part in events and further training, while the association represents their interests on a national level.

Table 7: Involvement of Energy Efficiency Experts[62]

Funding	Measure	Energy efficiency expert necessary?
BAFA & KfW	Individual measure (windows, doors, insulation)	✓
	Individual measure (heating + optimisation)	✗ Contractor declaration sufficient
	Technical systems (air conditioning & ventilation)	✓
	Technical planning + construction supervision	✓
	Only KfW: Efficient House (new construction, purchase, renovation)	✓

How to become a certified energy efficiency expert

Energy efficiency experts are usually professionals that have acquired a high degree of specialisation in energy advice as well as in the construction or renovation of energy efficient buildings.

In order to become a listed energy efficiency expert, the German Energy Agency (dena) has developed a multi-stage quality assurance system.[63] All experts are checked regularly. Some institutes for further education have specialized in the

[62] RENEWA 2022: The tasks of an energy advisor. Source (in German)

[63] German energy agency (dena): Energy efficiency experts. Source (in German)

training of energy consultants and energy efficiency experts and offer customized module programs.

- **Stage 1:** Upon initial registration, experts must provide evidence of their basic and additional qualifications (e.g. authorisation to issue energy certificates in accordance with § 88 of the Building Energy Act (GEG)).[64] The evidence is checked before the experts are added to the database.

- **Stage 2:** Every three years, the experts must provide evidence that they have taken part in 24 hours' worth of training courses. Some associations, such as the GIH Federal Association, offer (re)certification courses. In addition, they must provide proof of their practical work for each funding programme for which they wish to continue to be listed. Depending on the funding programme, this may involve energy consulting, planning or construction support, e.g. new construction or renovation of an Efficient House.

- **Stage 3**: All submitted proofs of practice are subjected to an automatic plausibility check. Additionally, random in depth-checks are carried out. To this end, the documents relating to the practical work for each funding programme (e.g. energy consulting report, Efficiency House planning or construction supervision) are checked. If the document review reveals a need for further clarification, neutral auditors additionally inspect the experts' services on site.

4.4 BEG in Practice

4.5.1 Ecosystem of the BEG Funding

In order to be eligible for BEG funding, energy consultants have to become certified ***Energy Efficiency Experts*** (see section 4.3).

The promotion of energy-efficient buildings and connected actors and stakeholders can be viewed as a special ecosystem in the building sector. The introduction of increased energy efficiency funding – in particular the BEG – has had a great impact on the development of this ecosystem. Supplementary to section 3.2, this section gives an overview of all actors involved.

The increased funding rates in 2020 and introduction of the BEG in 2021 were the main drivers for the surge in demand for funding by homeowners who wanted to build an energy efficient home or renovate their home according to the most recent requirements. As a result, a growing number of subcontractors (such as craftsmen, architects, etc.) recognized the market potential and started offering funding-compliant services based on customer demand.

Energy efficiency funding has also resulted in manufacturers not only developing products that comply with legal requirements, but also with the technical minimum requirements to be eligible for the federal funding. Additionally, new funding opportunities have led to energy consultants becoming more active as the funding

[64] German energy agency (dena): Initial entry as energy efficiency expert. Source (in German)

amount for energy consultation gradually increased and the involvement of energy efficiency experts was made mandatory.

The BEG has also impacted the relationship between subcontractors. While tradesmen generally used to be reluctant to involve energy consultants and have a third party inspect their work, the requirement by the BEG to hire an energy efficiency expert has contributed to improving working relationships that benefit all parties.

On the regulatory level, associations and unions are given the opportunity to continuously improve the funding programme, as they are involved in discussion rounds with the BMWK. On the practical level, they contribute to the preservation of the system, as they offer training for energy consultants, so that they can continue to maintain their certification as energy efficiency experts.

All actors in the "BEG bubble" are inevitably interconnected and thus a crucial part of the system. **Figure 6** gives an overview of all actors involved.

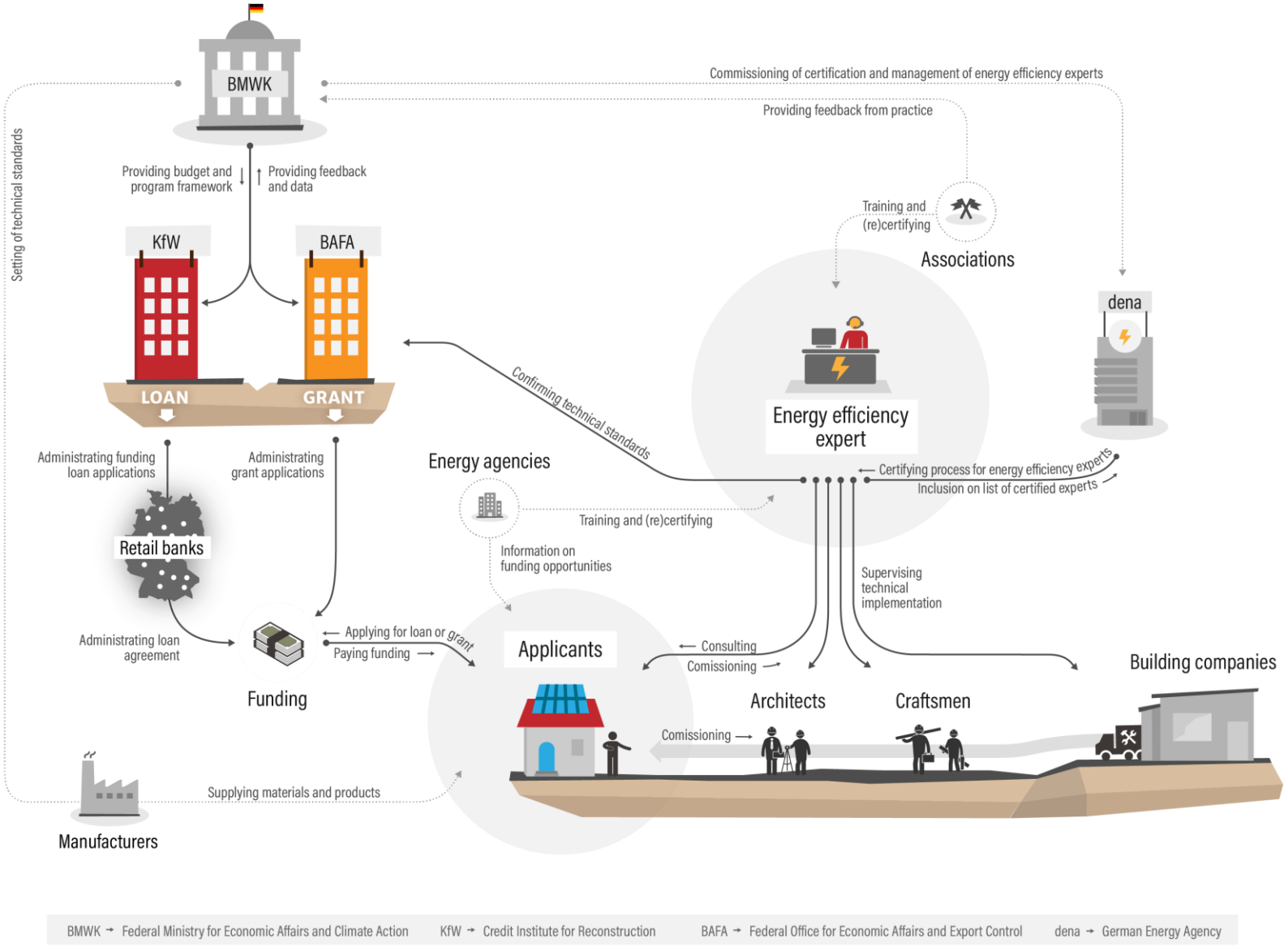


Figure 6: Ecosystem of the BEG Funding

4.5.2 Application, Approval and Implementation Process

This section focusses on the BEG in practice. It highlights the roles and responsibilities of all institutions and actors involved by visualizing the application and approval process from start to finish.

Please note: The following graphic solely focusses on the process of applying for a loan with the KfW. If applicants choose a grant (via BAFA or the KfW), the process looks slightly different, i.e. there is no need for a credit agreement.

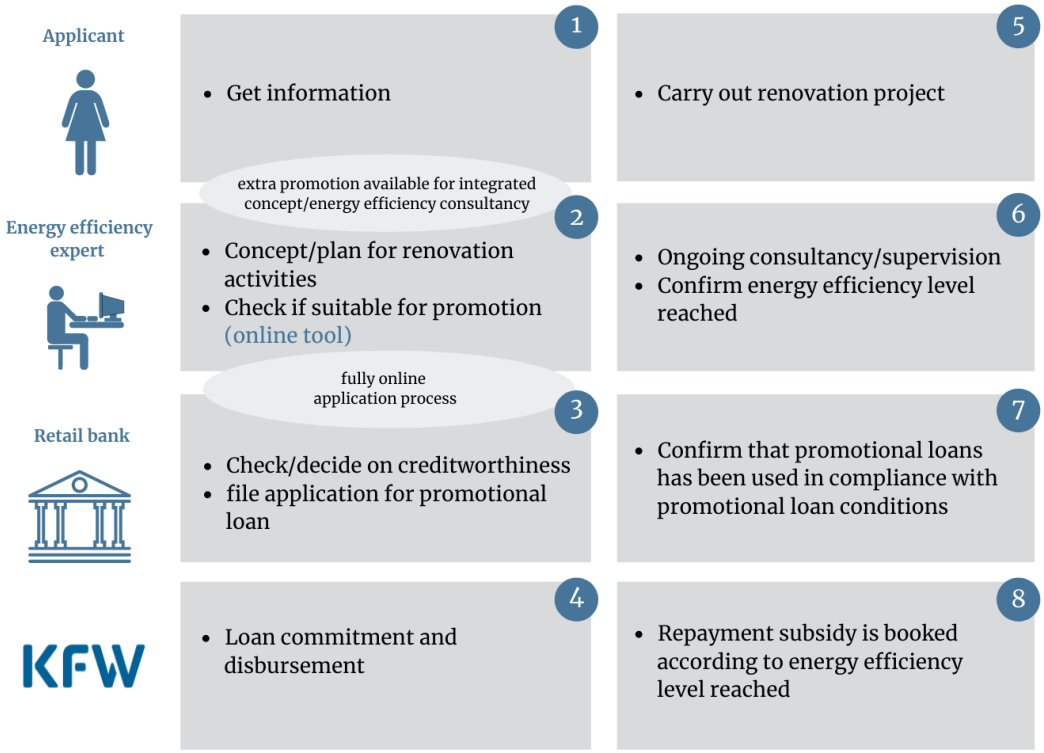


Figure 7: Steps of the KfW Process[65]

Step 1: The applicant gets information on funding opportunities. There are multiple websites with in-depth information available (such as kfw.de). If they need assistance, they can check the energy efficiency expert list and hire an expert to decide which measures should be implemented and which funding opportunities exist. The website *energie-effizienz-experten.de* also provides applicants with detailed information and checklists. Applicants might also learn about the funding opportunities from their retail banks.

[65] KfW 2018, adelphi

Step 2: The energy efficiency expert designs a detailed renovation plan and checks which funding programmes are suitable. The energy efficiency expert fills out the so-called *confirmation of application.*

Applicants have to apply for funding **BEFORE** any measures are implemented! Otherwise, the measures are not eligible for funding.

Step 3: The applicant uses the detailed renovation plan to conclude a loan agreement with a retail bank in order to receive financing. Before any loan agreement is signed, the retail bank conducts a creditworthiness check. The retail bank then forwards the application to the KfW.

Step 4: The KfW processes the application and grants the funding.

Step 5: The applicant hires subcontractors to carry out the renovation project. The energy efficiency expert sometimes advises on the selection of subcontractors to guarantee compliance with standards.

Step 6: The energy efficiency expert supports the applicant in the implementation process by supervising the building or renovation process. Once the project has finished, the contractors submit a declaration to the energy efficiency expert and thereby confirm that the measures were carried out professionally and in accordance with the funding conditions. The expert enters all necessary data into a special online tool and thereby confirms that the aspired energy efficiency level has been reached (*confirmation after implementation*). The applicant then submits this to the retail bank.

Step 7: The retail bank checks the data and confirms to the KfW that the funding has been used in compliance with the loan conditions.

Step 8: The KfW forwards the funding amount.

4.5.3 Motivation of the Stakeholders

The process of federal funding for energy efficiency financing includes various actors, each with their own goals and incentives. The system is designed in a way that creates positive outcomes for the parties involved:

- **Government/BMWK/BAFA:**
  - Supporting the achievement of the sector target for buildings set in the Federal Climate Protection Act (KSG)
  - Income generated from tax and social security contributions of the building and renovation projects

- **Customers / Applicants:**
  - Attractive and flexible financial conditions (choice between loans and grants, low interest rate, repayment subsidies)
  - Access to a wide range of funding opportunities (web-based; retail bank)
  - Professional support by an energy efficiency expert helps determining suitable measures and minimizes errors in the application and implementation process
  - In case of programmes administered by the KfW: Quick web-based approval process

  - Achieved energy savings and modern technology have financial and health benefits

- **Retail bank as on-lending partners**
  - Retail banks might acquire new customers by offering the KfW funding programmes
  - Offering the KfW funding programmes enhances the product spectrum
  - Cooperation with the KfW generates access to liquidity without capital refinancing costs
  - An implementation margin within the interest rate compensates the retail banks for on-lending activities
  - The KfW offers free training and information material for employees

- **KfW:**
  - The KfW consolidates its role as the government's implementation partner and expands its pioneering role in the field of energy efficiency financing
  - Through the involvement of the on-lending partner, the KfW is able to diversify its risks

- **Energy efficiency experts:**
  - Energy efficiency experts benefit from being able to offer mandatory services for the application for funding

4.5.4 Promotion and Campaigns

Germany has committed significant funding for the building sector over the past and into the future. But how does the state inform the public about the importance of energy efficiency and funding? This section focusses on how the German government and the KfW disseminate information about energy efficiency financing.

BMWK: Deutschland macht's effizient/Energiewechsel

In 2016, the BMWK launched the campaign "Deutschland macht's effizient"[66] (translation: *Germany does it efficiently*) to motivate all consumer groups—private households, companies and municipalities—to use heat and electricity efficiently. The overall aim is to inform, mobilise and achieve a change in awareness in order to give energy efficiency the attention it deserves in the context of the German *Energiewende* (energy transition). A key message is that energy efficiency does not mean renunciation but rather creates value. The focus is not just on simply saving energy, but rather on getting more out of energy. For this reason, the campaign emphasises above all the individual positive benefits that derive from energy efficiency.[67]

[66] In June 2022 the campaign was renamed "Energiewechsel" (Energy change)

[67] BMWK 2016: "Germany does it efficiently" Factsheet. Source (in German)

The campaign is supported by **various online and offline publicity measures**, such as information sheets and brochures, advertisements in national daily and weekly newspapers, news magazines, posters, online advertising and billboards. The core and target point for all communication measures is the **website** where private consumers, companies and municipalities can find all relevant information on the topic of energy efficiency. Additionally, there is a **service hotline** which is free of charge from German landlines.

The campaign also includes experts from associations, enterprises and trade unions who act as *energy efficiency ambassadors* and multipliers. They communicate with private households, companies and businesses directly and can use the campaigns' marketing materials for their own public relations work such as logo, posters and flyers.

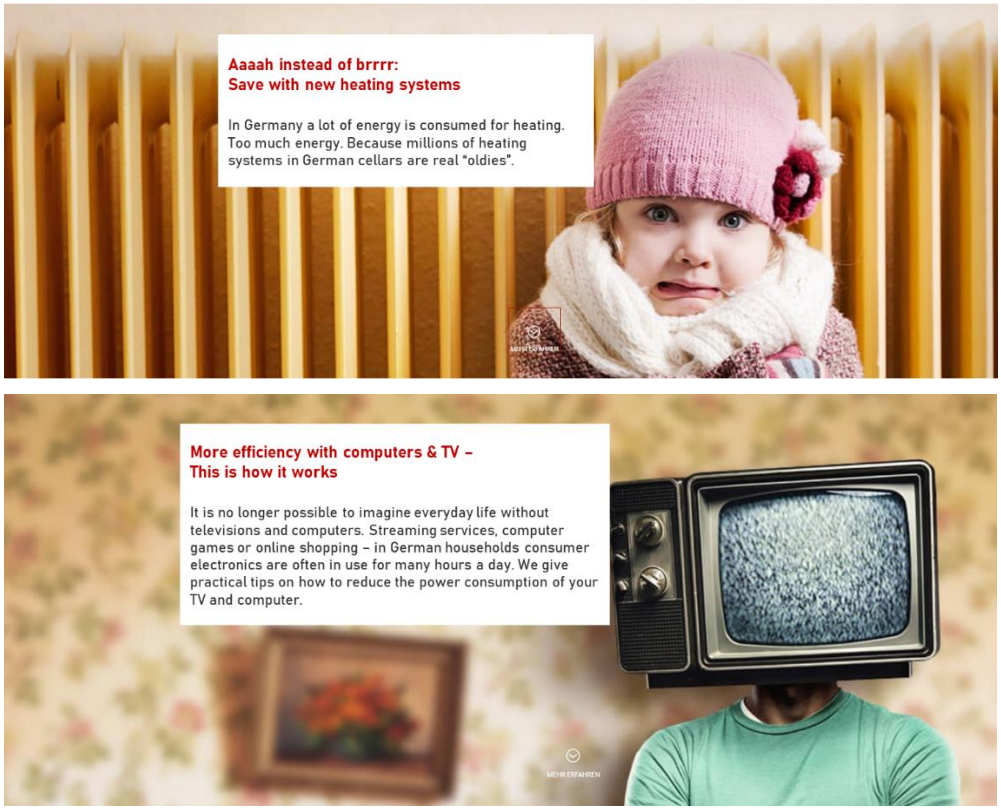


Figure 8: Translated Screenshots from the Deutschland macht's effizient[68]

A core element of the website is the funding guide. Here, interested homeowners, companies and municipalities can find the funding measure that suits their project with just a few clicks. After selecting the respective variables, such as build/buy/renovate or loan/subsidy, they are directly forwarded to the KfW or BAFA who offer the suitable product.

[68] BMWK 2022: Website "Germany does it efficiently". Source (in German)

KfW Campaigns

The KfW has been successfully financing energy efficiency measures for over 20 years via the broad network of retail banks across Germany. As a result, the parts of the public for whom the funding is relevant are generally well informed about the opportunities. The KfW therefore is not reliant on running big campaigns in order to promote new funding measures. Nonetheless, the KfW conducts extensive market and customer research in order to improve and tailor their products to their customers' needs in agreement with BMWK.

Besides the KfW website, which provides information on all funding programmes available, the KfW uses a variety of strategies and channels to reach, inform and interact with its target group:

- Prime time TV commercials
- Social media (YouTube, Instagram, LinkedIn, etc.) and influencer marketing
- Advertisement on real estate apps (e.g. ImmobilienScout24)
- Free trainings for energy efficiency experts and retail banks (*KfW academy*)

As the KfW does not interact with applicants directly it relies on **marketing through the retail banks**. By providing retail banks with a considerable amount of information material they can make use of extensive distribution channels to advertise their portfolio.

Energy efficiency experts usually do not need to advertise on a large scale. Through their certification and listing on the official website, they have no shortage of customers. Incidentally, many orders are obtained on the basis of word-of-mouth recommendation. Some consultants also have contacts with retail banks, which refer customers to them.

4.5 Quality Management, Data and Monitoring

The following section will outline some aspects of quality management, data collection and monitoring that is mainly relevant for the BEG programmes administered by the KfW.

Quality management

Ensuring quality and the fulfilment of technical standards is of crucial importance to the success of the scheme. There are several measures and instruments implemented by BMWK and the KfW for that purpose. First of all, detailed guidance is available on the technical standards that need to be achieved to be eligible for funding, including information on technical minimum requirements as well as technical FAQs.[69]

The mandatory involvement of energy efficiency experts in the planning, implementation and completion of measures is the most important instrument to ensure quality across funded projects. Applicants need to involve certified energy

[69] BMWK 2022: Guidelines for the Federal funding for efficient buildings (BEG). Source (in German)

efficiency experts that are listed on a website. In order to be included on this official list, the experts must fulfil various requirements, recorded in a separate rule book.[70] To be able to apply for funding, applicants need to receive a *confirmation of application* by an energy efficiency expert, for which a standardised check of the energy calculations is carried out, via the so-called EBS tool of the KfW. If the standardised check does not detect any abnormalities, the funding application is usually granted on the spot.

Safety of materials and products used for renovation and new construction is ensured by the necessity to adhere to EU legislation and carry the CE Certification.

After completion of the construction measures, the energy efficiency expert must issue a *confirmation after implementation* to verify that the technical minimum requirements are met, and only then will the grant or repayment subsidy be paid out.[71] More information on the application process and the tasks of the energy efficiency experts is provided in **section 4.3**.

The KfW also conducts random checks, including a review of the energy calculations underlying the measures for which a funding application has been received, technical verifications and invoice checks as well as on-site inspections. These random checks are only carried out for a fraction of the projects; quality is mainly ensured through the involvement of the energy efficiency experts. Accordingly, the application processing times for KfW programmes are relatively short, while the overall quality of implemented measures is extremely high.

In contrast, BEG grants for individual measures that are available at BAFA have much longer processing times, since BAFA checks each application individually.

Data

Data collected by the KfW and the retail banks include all information connected with the loan and grant applications. Within their annual funding report, the KfW publishes detailed information on the activities of the different business areas broken down by federal, state, district and programme level. This includes information on the successful applications for all Energy Efficiency House standards for both renovation and new construction as well as numbers of successful applications for each individual renovation measure.[72]

Newly established by the BMWK is a quarterly report dedicated to the BEG programmes, which includes high-level information on the number of successful applications for each programme, individual measures and Efficiency House standards.[73]

Real consumption data after the completion of the measures is not required and collected by the KfW or BAFA. Neither have indicators for climate adaptation been taken into account in the funding programmes or data collection yet.

[70] BAFA, KfW 2021: Rule book for the energy efficiency expert list. Source (in German)

[71] KfW 2022: Create a confirmation. Source (in German)

[72] KfW 2021: Funding Report 2021. Source (in German)

[73] BMWK 2022: Report for the BEG. Source (in German)

Monitoring

To continuously monitor the developments and achievements of the two main funding programmes by the earlier KfW programmes *Energy-efficient Renovation* and *Energy-efficient Construction*, the KfW commissioned regular monitoring reports of the programmes. Between 2010 and 2018, the monitoring was conducted by the Fraunhofer Institute for Manufacturing Technology and Advanced Materials and the Institute for Housing and Environment and all reports are publicly available.[74] Among other data, the achieved CO_2 emission reductions of the funded measures were quantified by means of questionnaires sent out to a sample of funding recipients in each year.

For the years from 2018 onwards, the monitoring reports/evaluations were commissioned directly by the BMWK and are not available as of yet.

4.6 Other Funding Programmes

Apart from the BEG for residential buildings, there are several other programmes that are available as supplements, or for other scenarios, such as the availability of BEG funding for non-residential buildings, which has not been addressed in this report. It is possible to cumulate BEG funding with other public funding; however, a cumulation limit of 60% applies to the funding of eligible costs.

The KfW also offers a fuel cell grant supplementing the BEG, which is also supported with funding by the federal government. The grant covers the installation of a stationary fuel cell heating system with a capacity of 0.25 to 5 kW. The fuel cell must be integrated into the heat and power supply of the building and can be implemented as part of new construction or renovation. The funding is only available as a grant for up to 40% of eligible costs and a maximum of €34,300 per fuel cell.[75]

Since 2020, costs for measures for energy-efficient renovation can also be used to claim tax reductions after an amendment to the Income Tax Act. The tax reduction is available for owner-occupied residential property with buildings that are at least 10 years old and can be claimed if the measures exceed the technical requirements of the Buildings Energy Act (GEG) – the same condition as for the BEG programmes apply. It is possible to claim 20% of eligible costs with a maximum amount of €40,000 over three years and in contrast to the BEG, there is no mandatory involvement of an energy efficiency expert. In addition, tax deductions can be claimed for up to 50% of costs for technical planning and construction supervision over three years.[76]

The KfW offers a *Home Ownership Programme* and an age-appropriate conversion programme that can be combined with the BEG as well. Also available from the KfW is a loan for the construction of renewable energy installations.[77] A funding programme for the serial renovation of buildings using pre-fabricated parts – a concept called *Energiesprong* pioneered in the Netherlands, has also been newly established. Through BAFA, the BMWK is providing €300 million to support the

[74] Institute for Housing and Environment 2022: Monitoring of KfW Energy saving programmes. Source (in German)

[75] BMWK 2022: Increasing energy efficiency with fuel cell heating. Source (in German)

[76] BMWK 2021: Tax incentives for energy efficient building renovation. Source (in German)

[77] KfW 2022: Promotional loans and grants for existing properties. Source (in German)

market uptake of serial renovation aimed at turning buildings into NetZero buildings, which produce as much energy as they consume. Energiesprong is a suitable instrument to renovate architecturally similar buildings. Funding is provided in three modules covering feasibility studies, development and testing of serial renovation in individual pilot projects and building up production capacities for serial renovation components.[78]

In addition to funding available at the federal level, the sixteen German states also provide subsidies for the renovation of buildings to varying degrees. Several states provide funding directly on top of the BEG (up to the cumulation limit) as well as for the construction and renovation of social housing projects. The state of Baden-Wuerttemberg offers support for serial renovation. State-level funding is specifically important for the renovation of public infrastructure, such as schools.[79]

There is also funding available at EU level for financing renovation in member states' building stock, namely the *European Structural and Investment Funds*, the *European Fund for Strategic Investments*, *Horizon 2020* and the *ELENA facility*.[80]

[78] BAFA 2022: Federal funding for serial renovation. Source (in German) & German Energy Agency (dena) 2022 : Serial renovation of apartment buildings. Source (in English)

[79] More information on the funding opportunities at state level can be obtained at the dedicated website for federal and state-level funding: https://www.foerderdatenbank.de/FDB/DE/Home/home.html

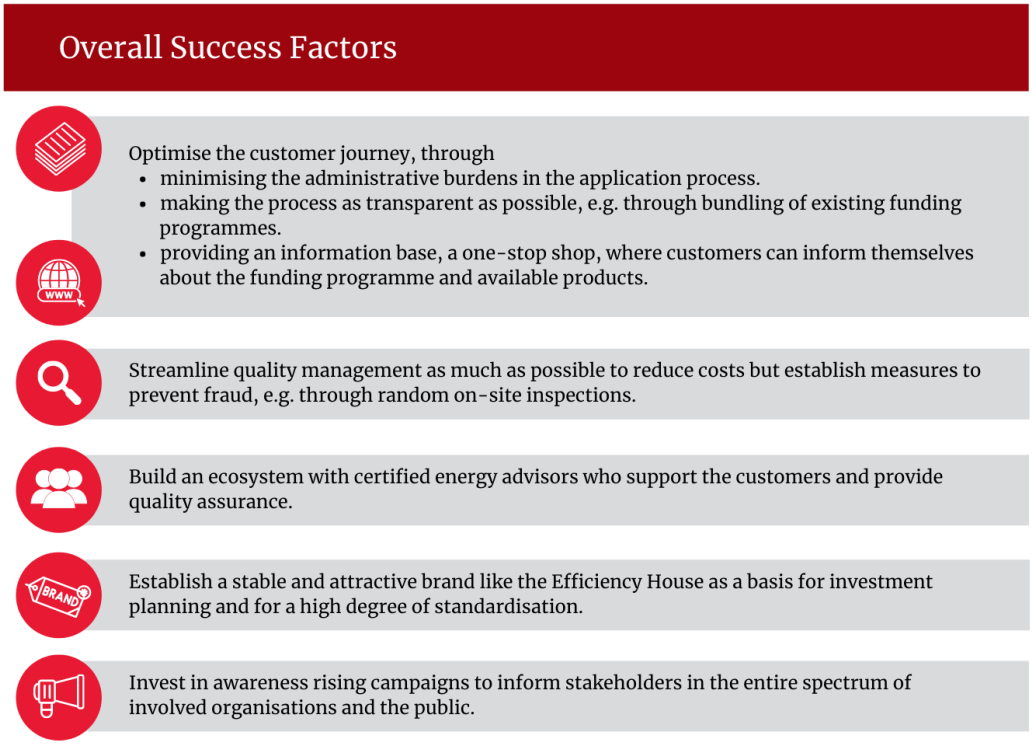
[80] European Commission 2022: Energy efficient buildings. Source (in English)

5 Success Factors and Towards Net Zero

This final section includes an overview of the success factors that were identified throughout the preparation of this report, as well as some background on potential improvements of the scheme and an outlook into the future developments.

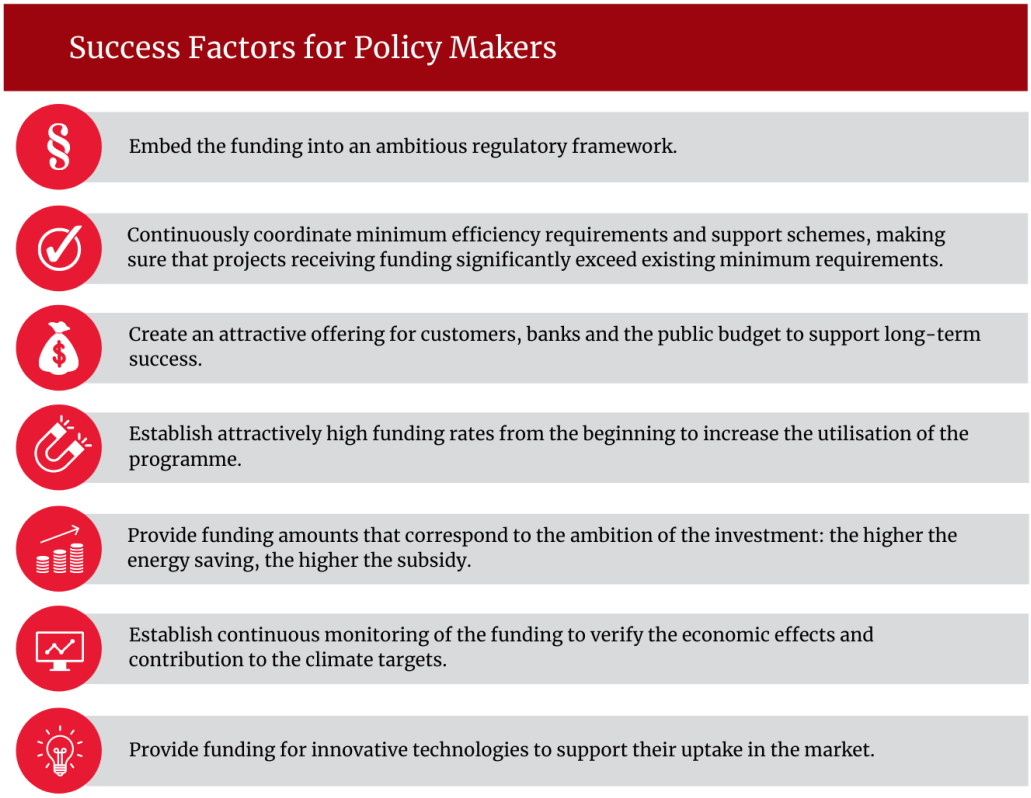
The funding for energy efficiency financing of buildings in Germany is widely viewed as a success in Germany and beyond. Although the scheme has been criticised for having a limited impact on accelerating renovation and emission reductions, it was successful in establishing technical standards for renovation and new construction, getting dedicated energy efficiency experts involved and developing an overall awareness and the ecosystem around it. Besides improvements that are more on the administrative and technical side, an overarching restructuring of the system towards incentivising renovation more strongly is ongoing and will continue throughout 2022.

This report identifies success factors in three areas: **overall success factors** and specific **success factors for policy makers** and **financial institutions**.



First off, the overall success factors include the optimisation of the customer journey which greatly increases the attractiveness and popularity of a scheme. Streamlining quality management is also an important success factor which has been implemented through the involvement of the energy efficiency experts for the BEG. The established ecosystem including the certified energy efficiency experts has been a cornerstone of the system and been invaluable in supporting customers and ensuring quality of implemented measures.

The Efficiency House standard has been very successfully established as an excellent brand to achieve standardisation. It has also been a key in facilitating targeted and easy-to-understand communication and creating a high recognition value. Investment in awareness-raising campaigns is also a success factor and has successfully informed stakeholders in the entire spectrum of involved organisations and the public.



There are many success factors crucial to policymakers when implementing such a scheme. First of all, one of the most important on-going success factors, is the embedding of the funding into an ambitious regulatory framework, in line with the German Government's goal to "demand, promote and inform". The second success factor is closely linked to that: To ensure the regulatory framework remains ambitious, the minimum efficiency requirements and the support schemes need to be continuously updated and coordinated, so that the maximum effect is achieved. As outlined, this process is currently ongoing in Germany. The funding for Efficiency Houses 55 for new construction has recently been discontinued, as it is planned to make this standard the legal minimum requirement for new construction.

Creating an attractive offering for all involved stakeholders is also important and key to the success of the programme. Applicants profit from the funding and the attractive conditions, in particular of the KfW loans, as well as from the professional and comparably quick application process and the support of the energy efficiency experts. The KfW profits from increased responsibilities and budget, the on-lending institutions get a profit margin and enhance their product spectrum for their customers. For the public budget, the funding budget is partly offset through additional tax income and social security contributions.

One of the main principles and key to a successful scheme is that higher funding amounts should go hand-in-hand with higher ambition. This has been implemented through the increased funding rates for more ambitious Efficiency Houses. Continuous monitoring is also important to verify that the desired effects are reached and allow the funding programme to be updated. The funding can and should also be used to incentivise the uptake of innovative technologies in the market.

Lastly, two additional success factors have been identified that may be of specific interest to financial institutions planning to implement similar schemes. Giving the customers flexibility in choosing from products is contributing greatly to the attractiveness of the scheme. The on-lending model in particular, which is very specific to the German KfW Bank, is playing a major role in the success of the scheme. Being able to offer the funding through a broad network of financing partners has reduced costs at the KfW side, while also making the funding and financing products as widely available as possible.

Towards net zero

Even though the BEG funding has had a very positive effect and is generally seen as a success story, there are some areas where improvements could be made.

The use of many billions of subsidies over the last few years have shown that the programme has been well received by citizens, but the effect on renovation rates and achieving emission reductions in the building sector has been limited. Too often, the subsidies may have benefited applicants who would have built or renovated in an energy-efficient fashion anyway. The goal should be to make the regulations sufficiently strict and then reward extra effort with funding. In addition, over the past years, the funding was largely used for new construction, and only 7% of residential buildings in Germany achieve the best efficiency standard to date.[81] Since 2012, 60% of the funding budget has gone into new construction although it only makes up 5% of the building stock. This imbalance has led to limited effects for the existing building stock, which is where the greater challenge and emission saving potential lie.[82]

Overall, the building sector in Germany is facing huge challenges. The German government's climate targets, which have been raised and moved forward, mean that almost every building in Germany must be climate-neutral by 2045. Exactly

[81] Deutsche Umwelthilfe 2022 : Funding check. Source (in German)

[82] Ifeu 2022: End the Unbalance in Funding for Buildings. Source (in German)

how this goal should and can be achieved and in what combination of regulatory law and funding will become increasingly clear in the coming months and years.

The ambitious plans at EU level will have a direct impact on the national regulatory framework in Germany. Relevant developments at EU level include but are not limited to the ***European Climate Law***, the revised ***Energy Performance of Buildings Directive*** (EPBD), the ***EU Taxonomy*** and the plans to extend the ***Emissions Trading System*** (ETS) to the buildings sector. The new draft of the amended EPBD signals the plans for a renovation wave of buildings with the lowest energy efficiency and highest energy bills. If adopted, the amended EPBD would require EU member states to set binding standards so that the worst performing buildings would reach better performances by 2030.

In national policy, the amended climate law has set ambitious targets for the building sector, requiring a reduction by over 40% until 2030 and climate neutrality until 2045. The two main regulatory instruments to achieve these targets are the **CO_2 price** in the building sector and the ***Building Energy Act*** (GEG). The German national CO_2 price on fossil fuels has been in place in the buildings, transport and small industry sector (all emissions not covered by the EU ETS) since the beginning of 2021 putting pressure on old and inefficient building stock. Currently, the system consists of a fixed price with yearly increases transitioning to an auction system in 2026 but it needs to be made more ambitious to comply with the revised climate law and the EU's **Fit-for-55** package. All these developments will further increase the pressure for renovation in the existing building stock and the demand for funding.

The German Government has also recently proposed an amendment to the Building Energy Act (GEG) with which the Efficiency House 55 will become the legal technical minimum requirement for new construction from 2023 on. The amendment also proposes to only allow heat pumps, district heating and heating with wood in combination with solar thermal. It has not outlined when the standards for new construction might further increase, or how the huge backlog in the existing building stock will be addressed.

While the BEG funding has already undergone some changes with regard to subsidies for new construction in 2021, another reform is in the pipeline. It is expected that the amended BEG will focus more strongly on renovation and worst performing buildings in the future.