FROM THE IDEA TO AN INNOVATIVE FINANCING CONCEPT AND BUSINESS MODEL FOR ENERGY EFFICIENT BUILDING REFURBISHMENT

A HANDBOOK

effin
Finanzforum Energieeffizienz
in Gebäuden

Contents

Legend

OWNER-OCCUPIED HOMES RENTED HOUSING COMMERCIAL PROPERTY PUBLIC AUTHORITY

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Information on how to use this handbook

This handbook summarises the outcome of the "effin – Finanzforum Energieeffizienz in Gebäuden" initiative, a forum which focused on the financial aspects of increasing the energy efficiency of buildings funded by Germany's Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety through the National Climate Protection Initiative and referred to as "effin" hereinafter. It is intended to provide practical advice for establishing or expanding innovative business models and financing offers for energy efficient building refurbishment.

effin started in early 2013 as a pre-submission forum for the development of business models for increasing the energy efficiency of buildings with a particular focus on the financing of such measures. Market-oriented solution approaches to financing and for realising the new business potential harboured by energy efficiency related renovation projects were developed within the scope of effin. Because the newly developed ideas and recommendations to foster energy efficiency measures are mainly market-based instead of policy-based, they can be adopted to other markets too - even if effin takes a German perspective.

The 24-month project was realised by WWF Germany and the German Industry Initiative for Energy Efficiency (DENEFF), and enjoyed the kind support of The CO-Firm GmbH, the law firm CMS Hasche Sigle, Prof. Dr. Ursula Eicker and Prof. Dr. Tobias Popovic from HFT Stuttgart University of Applied Sciences, as well as the architect María Ángeles Orduña Gañán.

The involvement of over 70 companies from the financial services, property and energy advice sectors and providers of energy efficiency solutions and energy suppliers guarantees the practical feasibility of the solutions developed. The issues concerning buildings owned by public authorities were, for example, discussed with city representatives from Frankfurt am Main, Stuttgart, Ludwigsburg and Ludwigshafen; regional energy agencies such as, for instance, Berlin Energieagentur, EnergieAgentur.NRW and Klimaschutz- und Energieagentur Baden-Württemberg also participated. In addition, 35 representatives from the political arena as well as 15 representatives from other environmental, industry and consumer organisations were consulted.

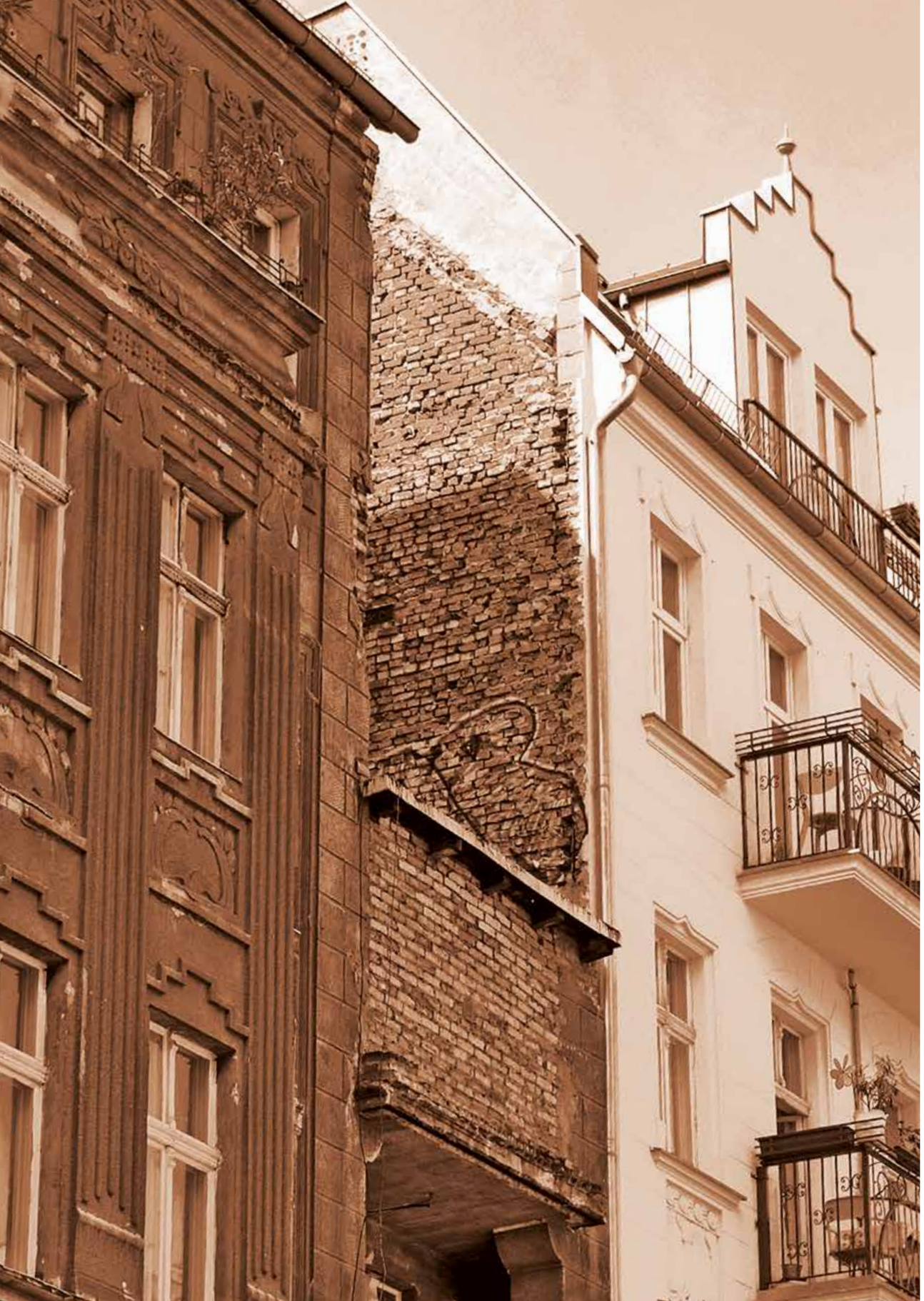
This handbook is a summary of the segment-specific innovation guides developed in the course of the effin project. It will hopefully give the reader a more in-depth understanding of the market mechanisms, the stakeholders involved and the specific challenges of improving the energy efficiency of buildings. The segment-specific guides are aimed at helping four groups of stakeholders with the development of innovative approaches and the implementation of market related solutions. These four groups are stakeholders in the areas owner-occupied homes, rented housing, commercial and public authority property. Accordingly, the four elements contain project results and innovation tools presented in a segment-specific way. These elements are aimed at the professionals and the decision-makers in the respective stakeholder group and therefore assume target-group specific expertise.

The website *www.effin.info* is available as a platform to facilitate the further exchange of ideas between stakeholders. You can also find additional project results there, for example other project ideas from the effin innovations workshop or the tool that was developed to evaluate the cost effectiveness of energy efficiency related renovations.

For all respective queries, please contact

DENEFF e. V. (German Business Initiative for Energy Efficiency)
Martin Bornholdt
Kirchstrasse 21
10557, Berlin, Germany
martin.bornholdt@deneff.org
Phone: +49 30 36 40 97 01

WWF Germany (World Wide Fund for Nature)
Dr. Erika Bellmann
Reinhardtstrasse 18
10117 Berlin, Germany
erika.bellmann@wwf.de
Phone: +49 30 311 77 72 06



2
Summary

Germany's building stock is responsible for 40% of the final energy consumption, and for around a third of Germany's greenhouse gas emissions. The majority of these properties, approx. 18 million residential buildings and approx. 1.8 million non-residential buildings, were built before the first Thermal Insulation Ordinance came into force. Many of the existing buildings therefore do not meet the current energy standards and offer a high energy savings potential.

As the most environmentally compatible energy is energy which doesn't have to be produced in the first place, increasing the energy efficiency of buildings is key to a successful energy transition ("Energiewende"). However, climate protection is not the only winner. Renovation measures that improve the energy efficiency of a building also make sense from a financial and economic perspective as they result in heating cost savings and reduce Germany's dependence on imported fossil fuels.

Why has energy efficient building refurbishment not really taken off? How to close the annual investment gap of 66 billion euros? effin's objective was to understand the barriers, and to develop practically feasible solutions in cooperation with corporate decision-makers and other stakeholder representatives, for example consumer and tenants organisations and local authorities.

The core result of this barrier analysis is that – contrary to the general perception – limited capital availability is only seldom a major obstacle. In fact, segment-specific barriers rooted in the respective business models and decision-making processes have much more of an impact. They are described in detail for each segment in this handbook.

Companies can unlock the hidden potential of energy efficiency for themselves with segment-specific solutions. Proposals for the rented housing segment that are also transferable to parts of the commercial property segment and the owner-occupied homes segment were developed in the two effin model projects. Additional solution approaches and ideas were presented in workshops and developed further. Policy-makers can promote the willingness to embark on energy efficiency projects by

+ Ensuring increased energy efficiency market transparency
+ Further improving access to investment capital
+ Shifting the focus more strongly towards heating costs and rents that include heating costs

The project participants would particularly welcome the following measures

+ Increasing the funding for independent energy advice, accompanied by a simplification of the funding options in favour of comprehensive energy advice of a uniform assured quality
+ Simplifying the building energy pass scheme in favour of a uniform, meaningful energy consumption pass
+ Introducing renovation road maps for particular types of buildings
+ Introducing tax credits for energy efficiency related refurbishment
+ Improving the framework conditions for energy related services
+ Introducing a nationwide rent register for rent including heating costs

effin sees its future role as that of a disseminator and a source of information for companies and politicians. In addition to this handbook, the effin project team invites you to have a look at the website *www.effin.info*. You will find further information about the subject and some open source tools there, and also information about events.

Thank you for your commitment to energy efficiency!

3
Market approaches to energy efficient building refurbishment can contribute to closing the annual approx. 66 billion euro investment gap

The German government aims to reduce Germany's CO_2 emissions by 80 to 95% by 2050, compared to 1990.[i] At the same time, the primary energy consumption is to be reduced by 20% by 2020, and by 50% by 2050, compared to 2008. The WWF study "Blueprint Germany – a Strategy for a Climate Safe 2050. Putting the Targets First" concludes that improving the energy performance not least also in the building sector is of major importance if Germany is to meet its greenhouse gas reduction targets.[ii]

Germany's building stock is responsible for 40% of the final energy consumption, and for around a third of Germany's greenhouse gas emissions.[iii] The majority of these properties, approx. 18 million residential buildings and approx. 1.8 million non-residential buildings, were built before the first Thermal Insulation Ordinance came into force and are currently being refurbished at a rate of around 1% p.a.[iv] Many of the existing buildings therefore do not meet the current energy standards and offer a high energy savings potential.

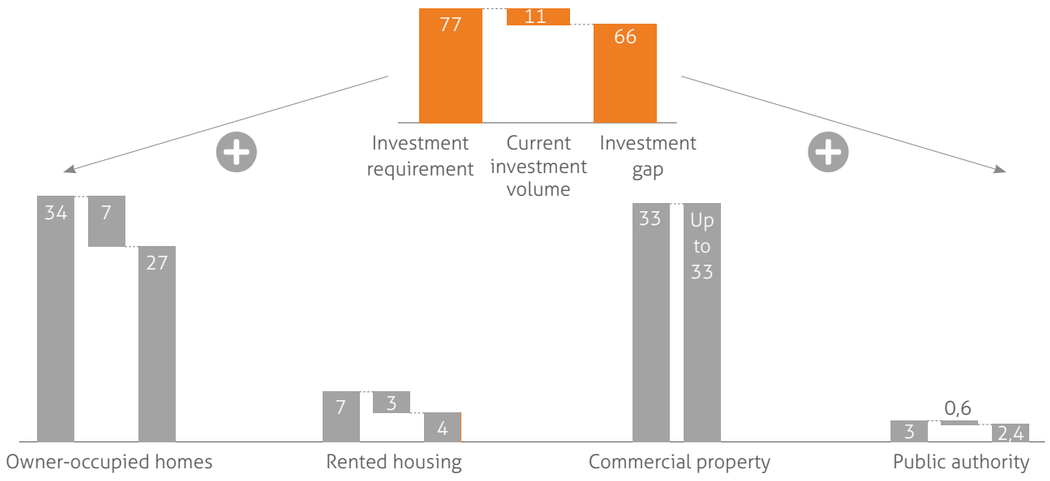
In the context of achieving the targets set out in the German federal government's energy and climate policies, energy efficient building refurbishment therefore has a key role to play.

According to the federal government's energy concept for the buildings sector, the existing building stock is to become almost completely carbon neutral by the middle of the century. In practical terms, this means that the rate of energy efficiency related refurbishments is to be increased to 2% p.a. in order to achieve a 20% heat demand reduction by 2020, and to manage to lower the primary energy requirement by 80% by 2050.

Only approx. 15–20% of the investments needed to improve the energy performance of buildings in order to decarbonise the building stock by 2050, approx. 77 billion euros per annum (2.8 trillion euros by 2050), are currently being made (see Fig. 1).[1] So far, it has not been possible to achieve the set targets and to unlock the associated potential by means of pure market mechanisms only.

The German federal government also agrees that the current funding activities cannot trigger such a transformation.[v] The reasons for the currently insufficient renovation activities in the market are varied and are also rooted in the segment-specific obstacles faced by the various stakeholders involved. The respective segments are owner-occupiers, the rented

Fig. 1: Building type segments and market potential for energy efficient building refurbishment



housing market, commercial property owners and public authority properties. The effin project's objective was the development of business models for increasing the energy efficiency of buildings with a particular focus on the financing needed to overcome these obstacles. In order to successfully guarantee this, effin attached particular importance to:

- Focusing intensively on practical feasibility aspects during the development of the contents and the ongoing cooperation with the stakeholders involved on the practical side,
- Developing highly market-oriented solutions,
- Developing approaches with a wide-ranging appeal to ensure maximum segment mobilisation.

The workshops held within the scope of effin and the analyses carried out in this context have shown that, contrary to the original assumption and the general public perception, capital availability and inadequate cost effectiveness are not the most important obstacles that prevent the realisation of energy efficiency measures in the buildings sector. In fact, one key barrier is simply the complexity of the energy efficiency market, of the accompanying funding landscape and of the financing offers. This impacts on the owner-occupier segment, where the decision-makers are private home owners, and also on the segments rented housing and commercial property, where the decisions are made by property industry experts. effin's two model projects focused on overcoming this obstacle.

A new concept for targeting home owners was developed for the owner-occupied segment Thanks to a cooperation between a renowned financial services provider and Germany's largest network of independent energy advisors, this entails an offer of comprehensive support to make it easier to understand the technical and financial issues involved and also ensures the quality of the advice. In addition, a new communication strategy was developed in order to take the specific needs of private home owners in relation to increasing the energy efficiency of their homes through refurbishment into account, rather than simply looking at the building value and socio-economic factors such as, for example, household income, which is usually the case for property related financing offers.

For the rented housing segment, an Excel-based valuation model was developed to transparently illustrate potential energy efficiency improvements and their cost effectiveness beyond individual buildings across entire building portfolios. Companies in the rented housing segment can use this as the basis to initiate systematic refurbishment road maps and to carry out the long-term optimisation of building portfolios with energy performance aspects in mind as well. The developed model project can also be transferred to the commercial property segment, under consideration of certain conditions (above all the nature of commercial leases).

In the public authority property segment, the respective building renovation activities are in part already quite numerous, at least where financially well-off local authorities are concerned. These local authorities are therefore not only fulfilling their role model duty but also realising considerable financial advantages for themselves in the form of the respective government subsidies and also by reducing their ongoing energy costs. However, there are many deficient and cash-strapped local authorities that do not have any capital at their disposal and are therefore also prevented from enjoying the respective subsidies. These local authorities cannot even consider taking out further loans. There are already a few innovative market approaches for local authorities battling with capital shortages or capital non-existence. For example, financing can be obtained without own capital with energy performance contracting solutions. Within the scope of effin events, these approaches were extensively discussed and developed further in order to make them better known and to encourage public authority property refurbishment activities.

[1] Through KfW Effizienzhaus 55 standard with a renovation rate of 2% p.a. The availability of data regarding the investments actually carried out varies considerably from segment to segment. Due to the lack of data for the commercial property segment, figures regarding the current investment extent have not been included. Past investments appear to be very low. It can therefore be assumed that the total necessary investment volume in this area is still unmet.

Up to 78% of the buildings and up to 52% of the CO_2 emissions of the existing building stock could be addressed with the effin model projects.

Further solution approaches help with overcoming the above described core obstacles or address additional segment-specific barriers.

Within the scope of effin, not only the short-term impact on CO_2 emissions was important but also the long-term perspective, and the incentive for investing promptly, considering the issue of "stranded assets". The analysis of energy efficient refurbishment in the rented housing segment, for example, led to the conclusion that investments which comply with the currently applicable legal efficiency standard (EnEV 2014) can result in heating costs that are twice as high for tenants, compared to a refurbishment to KfW 55 efficiency standard. Assuming that energy prices will increase by 5% p.a., heating costs in the two decades of the planning period will increase at an alarming rate and can have a negative impact on the attractiveness of EnEV 2014 housing, and therefore on lettability and on corporate profits. EnEV 2014 renovations should also be limited to measures with a short life-cycle as these houses would have to be renovated a second time before 2050, because the EnEV 2014 standard is not compatible with the federal government's targets for 2050. If a second renovation is due before the end of the life-cycle, this also results in financial disadvantages.

Excursus Box 1: Excursus on stranded assets

+ Investments or assets that suffer a considerable drop or loss in value before the end of the life-span/term assumed when the investment decision was made or even become a financial liability
+ Root causes are usually very important and can frequently be found in sudden changes in the law or the environmental conditions or technology breakthroughs which the investor did not foresee
+ In the context of energy efficient refurbishment, stranded assets can be the result if, for example, a refurbishment is carried out to meet a low standard and later, stricter rules call for a higher energy efficiency standard for existing buildings
+ Example from the perspective of a company in the rented housing segment: a facade is insulated to a low energy efficiency standard, and the insulation must be renewed before the end of the usual building facade life-span
+ Example from the perspective of a heating supplier: a heat generation plant does not take future renovation projects into account and therefore exceeds the size needed in the long term. Subsequent housing insulation leads to profit reduction

effin's primary objective was to find market related solution approaches that can also encourage increased renovation activities under the existing regulatory framework conditions. However, the project work carried out by those involved also revealed options for political action that could make it easier for more of the respective stakeholders to realise these solution approaches, or that would then make further options a possibility.

These particularly include measures which can lead to **increasing the transparency of the energy efficiency market:**

- Increasing the funding for independent energy advice, particularly in the area of owner-occupied private homes
- Simplifying the funding options for energy advice in favour of comprehensive energy advice of a uniform assured quality
- Protecting the professional image of energy advisors through official accreditation and respective qualifications (in a way that is also easy to understand for non-professionals)
- Introducing renovation road maps for particular types of buildings as a tool to be used by advisors
- Harmonising the building energy pass scheme in favour of a uniform, meaningful energy consumption pass
- Simplifying and harmonising the funding landscape. Ensuring that all subsidised financing means in the property sector can be used for energy efficient building refurbishment, e.g. Allowing the use of so-called "Wohn-Riester" housing saving scheme funds for energy efficient refurbishment projects

Further measures could additionally improve the **access to investment means**. In this respect, tax credit related measures would mainly benefit the owner-occupied, rented housing and commercial property sectors whilst improving the framework conditions for energy related services would especially help the cash-strapped local authorities.

- Introducing tax credits for energy efficiency related refurbishment
- Improving the framework conditions for energy related services
  - · Removing existing procurement law related barriers
  - · Removing the financial disadvantages resultant from subsidy claims or subsidised feed-in tariffs
  - · Adapting the rule regarding operating cost neutrality for the supply of heating

Guaranteeing the right investment incentives on the one hand and **social compatibility** on the other could be effected through a stronger political focus on rents that include heating costs and on the heating costs as such:

- Introducing a nationwide rent register for rent including heating costs
- Developing the tenancy laws further under consideration of socio-political and climate policy targets and the cost effectiveness of energy efficiency related measures and introducing alternative cost distribution models

4
Owner-occupied homes segment

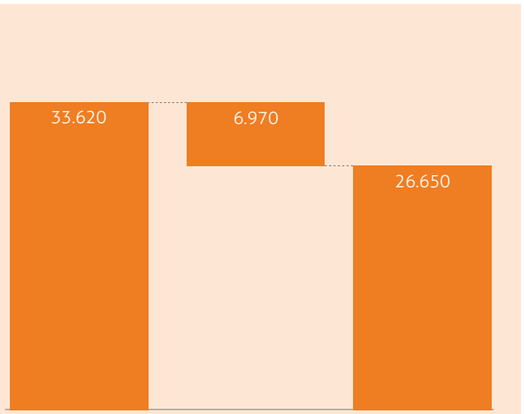
Potential in the owner-occupied homes segment

Approx. 17 million of the approx. 20 million buildings in Germany i.e. ~85 %) are residential buildings; most of these are privately owned.[vi] In order to achieve the targets set by the federal government, a reduction of over 101 megatons of CO_2 per annum would have to be realised in this stock, i.e. 39% of the overall targets.[i] This equals an investment requirement in energy efficient building refurbishment of over 33 billion euros per annum, but currently, only about ~7 billion euros p.a. are spent on respective measures.[vii]

The investment gap, and therefore the unexplored market potential for renovating the buildings in the owner-occupied home segment in line with the targets of the federal government, amounts to over 26 billion euros a year.[vii]

effin's work has shown that fundamentally, this investment requirement is also attractive for third party financing providers, whilst there are also financing means in the form of savings, for example, and sufficiently available in the market. Segment-specific barriers prevent these means being called on or invested.

Potential in the owner-occupied homes segment



Buildings	~17 million residential buildings; one or two household and terraced homes (88%), Multiple household or large multiple household homes (12%)[2] Not taken into account in the potential analysis are timber-framed buildings, due to the low stock and the necessarily specific refurbishment measures these require
Owners	Mainly owner-occupied private homes
Share of building sector CO_2- emissions	39 %[i]

[2] This segment also takes multiple household homes and large multiple household homes owned by several private owners into account in order to differentiate them from multiple occupancy homes in the rented housing segment.

4.1
The most significant barrier in the owner-occupied home segment is the complexity of the energy efficiency market

The reasons why home owners frequently decide against energy efficient refurbishment measures were analysed in workshops involving eight financial services representatives, four energy advisors and eight suppliers of energy efficiency products and services aimed at the private home owner segment. These revealed that the following four core obstacles have an inhibiting impact:

- High complexity of the technical solutions, of the financing options and of the funding landscape
- No comprehensive advice geared towards the individual needs of private home owners
- Uncertainty and lack of trust when it comes to the sums and the feasibility of the projected energy cost savings
- Emotional value perceived as low

Of initial importance for the decision for energy efficient refurbishment is an awareness of the added value of the investment. (Future) private home owners usually view this as a purely financial advantage in the form of heating costs saved. An emotional or social added value – which is clearly attached to car or telecommunication technology purchases, for example, or when adding a conservatory, a sauna or a pool to a home or buying a robotic lawnmower and a decisive factor in terms of the purchasing decision – is so far not generally attached to energy efficient refurbishment.

To get a clear picture of the costs and the potential savings, most private home owners currently obtain advice from several sources: on the one hand, from numerous suppliers who mostly specialise in one solution option (e.g. central heating engineers, roofers) and are therefore not able to draw up comprehensive refurbishment plans or are maybe also not interested in doing so impartially and objectively for profitability reasons, and on the other from an energy advisor, although the independence and quality of the advice given is sometimes questionable, or at least appears to be as far as the private home owners are concerned, because they do not know what to make of the numerous small-scale suppliers lacking a well-established reputation. And finally by an expert advisor who explains the complex financing and funding landscape. In view of the low emotional added value, there is usually no motivation for this kind of intensive groundwork, and even after considering the issue for some time, non-experts are frequently not convinced that the promised energy cost savings are in fact realisable, and that the respective expenses are in fact manageable.

From the financial services provider perspective, the complexity of the market is also a barrier and leads to

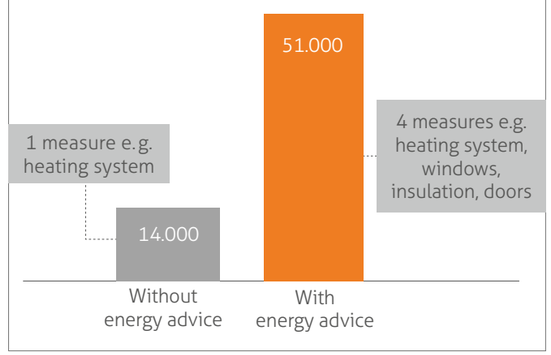
- Energy efficient refurbishment financing marketing that is not cost effective,
- Limited cross-selling potential,
- A restricted business potential, because individual measures with costs that fall below the third party financing thresholds are carried out, rather than comprehensive refurbishment projects.

The latter is rarely motivated by the fact that only one measure makes sense in that particular building, but by the fact that the benefit of additional measures is not immediately obvious. Both the practical experiences gained in the course of the effin model project and the results of surveys carried out by the KfW and the Federal Office for Economic Affairs and Export Control (BAFA) substantiate this: according to the KfW, the sums invested in energy efficient refurbishment increase by a factor of approximately 3.6 subsequent to consulting an energy advisor, and by a factor of 1.2 according to the BAFA. Advice can guide private home owners away from individual measures towards comprehensive refurbishment. As the quality of the advice increases, the refurbishment extent therefore also increases, along with the financing needs and the potential energy cost savings.

Fig. 2: Effect of energy advice on the sums invested in energy efficient refurbishment

Energy advice leads to higher investments in energy efficient refurbishment

Sum invested in energy efficient refurbishment (in euros)



The challenge faced by energy advisors and those who realise the advice given is that they are often small, relatively unknown companies with restricted access to customers. Counteracting the complexity of the market with an integrated offer including comprehensive advice would be in the interest of all stakeholders and could contribute significantly to realising the currently unexplored potential of around 26 billion euros annually. That is why, within the scope of effin, a model project was developed that realises such a comprehensive offer guided by the needs of the private home owners in the form of a cooperation between financial services providers and the energy advisor network. A new communication strategy that takes the particular characteristics of energy efficient refurbishment into account was developed for this, and also a discussion guide which the customer service staff in the branches can refer to.

Cooperation partners

LBS West: one of nine regional savings banks belonging to the LBS Group; looks after 2.1 million customers whose 2.6. million home loan savings plans total over 65 billion euros

energetrium: national network of independent energy advisors

4.2
The market can come up with solutions – effin model project: "Development of communication concept aimed at private home owners"

On the one hand, what motivated LBS West to cooperate with energetrium and to get involved in the effin project was the importance of energy efficient refurbishment in business policy terms, due to the currently unexplored market potential of 26 billion euros a year in the owner-occupied home segment. On the other, the reasons can be found in the policies of the German Savings Banks Association (DSGV), which is committed to encouraging its customers to making improvements that benefit environmental protection, energy and resource efficiency. Another aim is ensuring more long-term customer loyalty through property life-span.

The outcome of the cooperation with energetrium, with its independent energy advisors and high level of service-orientation, is a comprehensive advice and support bundle. This consists of an initial advice session at LBS West which is followed by a detailed survey of the home, carried out on site by an energy advisor. On the basis of this, various refurbishment measures are determined and a refurbishment road map is drawn up; its cost effectiveness is then discussed in a second advice session in detail. LBS West is responsible for the financing; energetrium confirms that the measures merit funding in order to obtain KfW subsidies or KfW special term loans. energetrium also offers the option of expert support in the form of professional management of the building measures during the refurbishment phase, and also experts who will confirm that the fund were used appropriately and in accordance with the application made to the KfW. The private home owner is then also given an energy pass that is valid for the next ten years.

Also required was a target-oriented energy efficiency focused communication strategy to be able to introduce the issue in the course of providing customer advice. When it comes to property related financing, customers are traditionally segmented according to building value and income. However, this may not be the best approach for energy efficiency projects, which are not so much defined by the value of the property but rather by the future heating cost savings, and in part require low financing volumes. The communication strategy is aimed at addressing customers on the basis of their individual situation in life and their status as an owner-occupier in order to be able to introduce all the right arguments when advising customers directly.

Findings

- Resegmentation of the demander market. The most important differentiation criterion is the so far non-existent aspect of "refurbisher type", which depends greatly on the potential refurbisher's life situation and life events:
  - "Buyer", approx. 30–45 years old, reason for branch visit usually purchase of own home
  - „"Occupier", approx. 45–59 years old, reason for branch visit for example extension of the original loan
  - "Converter", over 60 years old, reason for branch visit renovation or age-friendly conversion
- Refurbisher type profiles. The differing motivational sets, hopes and worries of the three customer groups were examined by means of empathic exploration to arrive at profiles in order to understand the customers better.
- In-branch discussion guide

One example of an energy efficient refurbisher profile and the discussion guide for in-branch use developed in the course of the effin project can be downloaded free of charge from *www.effin.info*.

Outlook and potential implementation

After a brief market testing period involving around 25% of the LBS West customer centres, the offer is to be gradually extended to other areas of the market. In this way, it could soon become a customer services standard.

Transferability of results

The logic governing this communication is transferable to 95% of the owners of one and two household or terraced homes in Germany. Consequently, approx. 95% of the CO_2 emissions in this segment could be addressed.

Ultimately, all of the stakeholders involved benefited from this comprehensive support, including integrated offers. It shifts a lot of the effort away from the owner-occupiers and puts them in a position that allows them to promptly recognise and implement those energy efficiency measures

that make sense for their home. They can reap the benefits of heating cost savings and a more comfortable living standard and avoid wasting money on less suitable measures. The financial services providers can minimise their marketing expenses. and it makes it easier for them to gain access to the energy efficient refurbishment financing market. Energy advisors benefit from improved access to customers. From a systemic perspective, this results in a contribution to lowering the CO_2 emissions in the buildings area and increasing the renovation quota.

If you would like to find out more about the project, please contact

LBS West
Mr. Jan Pohlschmidt
Himmelreichallee 40
48149 Münster, Germany
jan.pohlschmidt@lbswest.de
www.lbswest.de

energetrium AG
Mr. Ferenc Ellermann
Am Wassermann 36
50826 Cologne, Germany
f.ellermann@energetrium.de
www.energetrium.de

Fig. 3: Emotional activation paths

Especially emotionally activating in terms of energy efficient home refurbishment are the key areas "Nesting" and "Fit to live in"/"Healthy home"

"Nesting"	"Fit to live in"/"Healthy home"
	
• Comfort/cosiness • Aesthetics/lifestyle • Security • Status • "My home is my castle" • "A roof over your head, or a home?" • "The oil tank used to be where my room is now." • History of the house associated with family history • Birds nesting in winter on non-insulated houses	• Is your house "fit"? • I am working hard for improvements. • I don't have to worry too much about money. • I want 1st place. • The combination of many components leads to the right result. • Team/coach • Rising above yourself • One major effort and then relaxation and no worries for a while.

Source: The CO-Firm; Participants Owner-Occupier Workshop 3 pilot project; *https://www.youtube.com/watch?v=yO7qZ4eNZrw; weight watchers; national geographic*

Fig. 4: Example profile "Occupier"

In view of their many responsibilities and wide-ranging experience, "occupiers" expect to receive an "all-inclusive bundle" from the experts

Occupier
Age 45 – 59
Smith family

- **Motive:**
  - First major home improvements/refurbishment measures have become necessary (windows, heating system etc.)
  - Usage changes
  - Follow-up financing
- **Typical reasons (if the issue is proactively brought up by the customer):**
  - Follow-up financing
  - Renovation financing

Typical initial situation

Worries/fears	Hopes/benefits	Expected from bank/service provider
• Life already difficult enough without living on a building site • Past experiences with tradespeople during house purchase/building project • Financing model not as envisaged/ not cost effective	• Combination with follow-up financing that is needed in any case • Subsequently no repairs for quite some time and no worries about rising energy prices • Increased living standard	• "All-inclusive bundle" from the experts • Quality has to be right

Source: The CO-Firm; participants Workshop 2

4.3
Further options for increasing the willingness to refurbish in the owner-occupier segment

Examples for further market related solutions

To increase the confidence in the quality of the advice and its implementation, the company KlimaProtect (see Profile 8.4) offers insurance that covers the energy savings promised. This innovative protection product gives those who implement energy efficiency measures the option of having their statements regarding the potentially to be achieved heating cost savings independently verified and insured. This guarantees the clients that they will benefit financially. The insurance is paid out if the heating cost savings do not amount to the sums promised.

Energy efficiency cooperative societies (see Profile 7.2) are another option for verifying that energy efficiency measures actually fulfil their purpose and to finance them.

Potential support options for policy-makers

The companies involved in effin explicitly welcome the **encouragement of energy efficiency measures through tax credits**. They can help to increase the willingness to carry out energy efficient building refurbishment measures. However, this also calls for measures that increase the transparency of the energy efficiency market.

Particularly important for the owner-occupier segment would be **improved framework conditions for energy advice**. The subsidy rate for energy advice for owner-occupied private homes should be increased to at least the subsidy rate for energy advice enjoyed by SMEs. For the owner-occupier, this lowers the hurdle when it comes to commissioning an independent energy advisor, and there is less risk that citizens will resort to free of charge energy advice that is not truly independent but coupled to the selling of certain energy performance products. The forum participants believe that the simplification and standardisation of the funding in favour of comprehensive energy advice would also be a sensible step to take. The currently existing options, for example with/without thermography, with/without electricity advice, with explanation of the results via the telephone vs. second appointment on site are confusing for non-professionals and can lead to opting for an inadequate extent of advice. To be welcomed is the funding amount increase already announced in the National Action Plan on Energy Efficiency (NAPE), as it secures the livelihood of independent energy advisors.

Also desirable would be protecting the profession of energy advisor in order to promise a guaranteed minimum level of qualification.

As a new tool for advisors, the **renovation road map for individual building types** to be developed within the scope of the National Action Plan on Energy Efficiency (NAPE) can increase the quality of the energy advice given and also the degree of refurbishment in the owner-occupied home segment. Critical for its success, according to the corporate voices, will be bringing the individual life situation of the home owners and their financial situation into a sensible timing sequence, and taking both measures of an investment character as well as those without an investment character into account.

According to the companies involved, standardising and simplifying the funding landscape in the owner-occupier area could also have a positive impact **on releasing the so-called "Wohn-Riester" housing saving scheme funds for energy efficient refurbishment projects**. "Wohn-Riester" funds can currently be used for age-friendly conversion measures, but not for energy efficient refurbishment. This is difficult to comprehend as age-friendly conversion measures should ideally be carried out in combination with measures related to improving energy efficiency. Energy efficiency measures also make a significant contribution to security in old age as they protect older owner-occupiers from excessively rising heating costs. In ordinary financing practice, loans are frequently more difficult to come by for older people, which represents a barrier to energy efficient refurbishment at a point where synergy effects could actually be utilised.

In the long term, further impulses for investing in energy efficiency improvement measures can be expected from placing a stronger emphasis on the emotional and social added value for the individual home owner. In this respect, it would have to be examined whether a targeted communication on the part of the policy-makers on the benefits of energy efficient refurbishment enjoyed by the individual target groups up to a government-sponsored energy efficiency campaign could make a contribution.

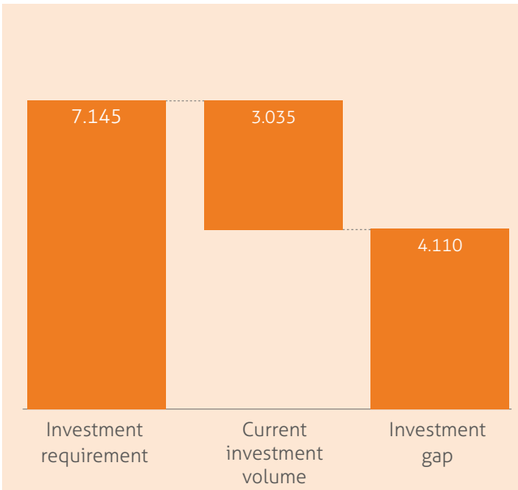
5
Rented housing segment

Potential in the rented housing segment

Approx. 990,000 buildings in Germany are multiple household residential buildings owned by property companies or housing associations; this equals ~5% of the building stock in Germany.[xi] In order to achieve the targets set by the federal government, a reduction potential of over 18 megatons of CO_2 per annum would have to be realised in this area, i.e. ~7% of the overall target.[xii] This equals an investment requirement in energy efficient building refurbishment of over 7 billion euros per annum; currently, only less than half this amount is being spent on respective measures. [vii] The additional investment requirement and therefore the additional unexplored market potential for renovating the buildings in this segment in line with the targets of the federal government totals over 4 billion euros a year.

The work carried out within the scope of effin has shown that extensive parts of this potential can be realised in an economic and socially responsible way. The fact that this happens to a limited extent only is due to segment-specific barriers.

Potential in the rented housing segment



Buildings	~990,000 multiple household buildings and large multiple household buildings Due to the low stock and the necessarily specific refurbishment measures required, timber-framed buildings were not taken into account
Owned by	Property companies or housing associations
Share of building sector CO_2- emissions	7,2 %[i]

5.1
The most important barrier is the lack of transparency when it comes to the potential harboured by energy efficient refurbishment, especially from a portfolio perspective

In property companies, decisions regarding energy efficient refurbishment are usually taken within the scope of the general maintenance plan, and therefore have to compete with other measures such as renovation, improvement or modernisation measures. When assessing the measures from a financial perspective, the competitive environment (above all property location) and the framework conditions defined by tenancy law have to be considered, and also potentially applicable local authority directives, especially when it comes to local authority housing, This includes, for example, caps applying to rents excluding heating costs.

In the workshops attended by 30 participants from the rented housing segment, energy supply companies, contractors and housing associations looked at how energy efficient refurbishment measures could be included in building maintenance plans and why they are decided on or against. This analysis showed that often, there was a lack of approaches for systematically and consistently assessing the property portfolio in terms of energy efficient refurbishment.

Particular challenges are:

- Portfolio assessment. As the optimum measures for each individual building differ, it is also difficult to draw up an assessment from the portfolio perspective;
- Determination of the period to be examined. Because the various measures have different life-cycles, it is a good idea to assess the long-term effects.
- Lack of cooperation with energy suppliers. Larger building complexes harbour optimisation potentials across all of the individual buildings, e.g. Heat islands, whose planning, installation and operation calls for a coordinated approach.

In consequence, energy efficient refurbishment measures are currently not yet an element that is included in the traditional portfolio development and potential synergies between energy efficient refurbishment measures and other measures are not utilised, which in turn leads to energy efficient refurbishment measures being perceived as more expensive.

As far as portfolio shares that are governed by local authority housing laws are concerned, it must also be taken into account that local authorities equally have little incentive to drive energy efficiency optimisation ahead as the focus of local authorities, e.g. in terms of government transfers, is primarily on the amount of rent excluding heating costs. There is also no demand for energy efficient refurbishment on the tenants' part. Tenants are above all worried about rent rises, and of potentially being pushed out due to the energy efficient refurbishment. The short-term benefits for tenants are usually scant, and the long-term benefits enjoyed thanks to heating cost consistency are not recognised or questioned.

Within the scope of effin, a model project involving a residential housing company and an energy supplier cooperating in order to come up with a simple model for energy efficient refurbishment across a portfolio of buildings was developed. It was then applied to analyse a sample portfolio whilst intentionally assuming ambitious social value parameters, e.g. rents excluding heating costs capped at the normal ALG II (unemployment benefit) housing benefit level and cost neutrality after modernisation, i.e. the subsequent lower heating costs must not be compensated by increasing the rent element in rents which include heating costs.
The results therefore also take the interests of the tenants and the local authority stakeholders into account.

5.2
effin model project: Development of a simple mechanism for assessing the economic viability of energy efficient refurbishment measures in the residential housing segment

This project was defined and carried out together with bauverein AG Darmstadt and HEAG Südhessische Energie AG (HSE)/ENTEGA. In the course of it,

- Numerous technical and accounting aspects were integrated into one easy to use Excel-based tool
- Ensured that this tool can be applied to portfolios as well as individual buildings
- An integrated all-inclusive approach to the costs (full-cost) was applied,
- Assessment to both KfW 55 and also EnEV 2014 standard was made possible,
- An energy supplier was directly involved in the solution development,
- A long-term perspective was taken and a refurbishment road map developed,
- Differentiated between rents including heating costs and rents excluding heating costs, and a potential solution approach to the cost neutrality challenge was shown

The model can be applied to all portfolio types and is available in Microsoft Excel. It can be downloaded free of charge from *www.effin.info*.

The model described above was used to analyse a bauverein AG Darmstadt building portfolio which consists of 78 buildings mainly built in the 19th century. Some of these are listed. The portfolio's current energy efficiency status lies considerably below the German average (portfolio 246 kWh/m² vs. the 216 kWh/m² averaged by Germany's multiple household residential buildings).[xiv] Most of the rents currently charged lie below the ALG II housing benefit threshold. This building stock

Cooperation partners

bauverein Darmstadt AG: largest residential property company in south Hesse with currently over 18,000 units

HEAG Südhessische Energie AG (HSE): Darmstadt-based energy supplier in which the local authority has a majority shareholding; through its subsidiary ENTEGA, HSE supplies renewable energy to over 350,000 customers

Excursus Box 2: Cost neutrality of rents charged including heating costs – what does that mean over a period of 25 years?

+ Increase of rent excluding heating costs is limited to the energy costs saved through the refurbishment, independent of the actual investment cost of the refurbishment measure
+ Annual rent increase equalling the additional savings made thanks to the energy price increase related costs avoided (assumed energy price rise: 5% p.a.)
+ Annual rent increases in line with the Federal German office for national statistics' consumer price index for subsidised housing or in line with historic price increases for non-subsidised housing
+ Re-let units: rent increase to the ALG II housing benefit rate for housing costs

is governed by the city of Darmstadt's social charter, which demands the kind of cost neutrality described above and rent capping in line with ALG II housing benefit rates. The resultant rent levels subsequent to refurbishment remain affordable for all social groups. In the model project, the potential rent increases across the period examined were restricted to the level of rents including heating costs with the assumption of cost neutrality applied.

Findings

The joint analysis has shown that the structural state of most of the buildings in the portfolio examined calls for almost 50% of them to be fully refurbished. In the remaining buildings, only the heating systems will be replaced in the next 10–15 years. Looking at the entire portfolio (full refurbishment and heating system replacement according to the above stated assumptions and conditions), 65% of the buildings could be modernised in a cost neutral and economically viable way to EnEV 2014 level in 2015, and 49% to KfW 55 standard. Although overall, less buildings can be modernised in a cost effective way, the KfW 55 standard CO_2 reductions would be significantly higher, which would lower the portfolio's total emissions by 39%. Refurbishment to EnEV 2014 standard, on the other hand, would only reduce the CO_2 emissions by 22%.

With a view to consistency in achieving the targets defined for an energy turnaround, which calls for a complete refurbishment of Germany's building stock, the following results relate to the full refurbishment part of the portfolio.

Here, the analysis showed that according to the above stated assumptions and conditions, 47% could be refurbished in a cost neutral and economically viable way to the EnEV 2014 standard in 2015. The CO_2 reductions in this portfolio segment amount to 25%. If, on the other hand, the KfW 55 standard were the aim, another 37% of this part of the portfolio could be refurbished in a cost neutral and economically viable way. Although in this case, less buildings would be refurbished overall, the CO_2 reductions are higher and amount to 28%, in terms of the entire portfolio. Across the period examined, rising energy costs lead to further refurbishments becoming economically viable, especially in the KfW 55 area. Concurrently, the proportion of the buildings which could additionally be refurbished to the KfW Effizienzhaus 55 standard in a cost effective way increases more dramatically than with the EnEV 2014 standard. Overall, 53% of the buildings could therefore be refurbished to EnEV 2014 standard in a cost effective way in the investment period up to 2025, and 50% to KfW 55 standard.

A long-term examination up to 2050 shows that any refurbishments to EnEV 2014 standard should primarily consist of measures of a short-lived character as the EnEV 2014 energy efficiency standard is not compatible with the federal government's 2050 targets. Although EnEV 2014 refurbishments are more cost effective in the short term, they are also at risk of potentially turning into stranded assets (see Excursus Box 1).

From the tenants' perspective, the refurbishments do not impact on costs. There are no additional costs for existing tenants as the refurbishments are carried out in a cost neutral way and do therefore not affect the rents including heating costs paid. In the case of re-let units, the rents excluding heating costs are limited to ALG II housing benefit rates.

Outlook and potential implementation

The model project will continue even after the effin project has finished. Current plans include

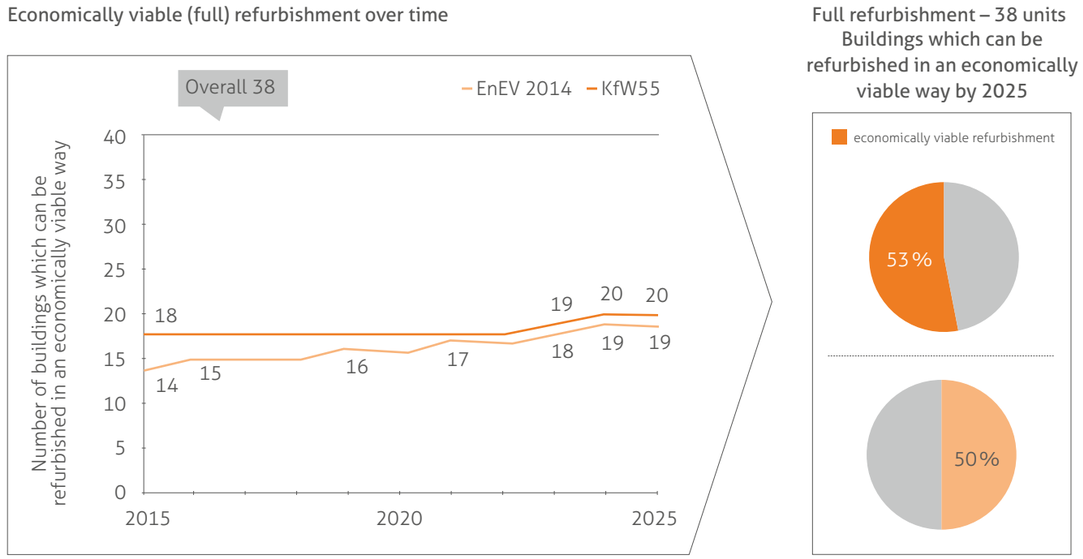
+ Integration of the model into the bauverein AG Darmstadt processes
+ Finalisation of possible courses of action for the individual buildings ("Refurbishment Roadmap at the Individual Building Level", see Fig. 6; potential bauverein refurbishment roadmap),
+ Involving the tenants and the local authority in the energy efficient refurbishment plans,
+ Carrying out energy efficient refurbishment measures and implementing the refurbishment roadmap.

Transferability of results

The model developed in the rented housing segment model project and the methods and approaches it was based on (full cost approach, cost neutrality for tenants) can be applied to 100% of the building stock owned by property companies in Germany, including all their emissions. Approx. 30% of the existing stock of multiple household and large multiple household buildings in Germany are owned by property companies; these buildings are responsible for approx. 7% of this sector's emissions.[xv] Although the results regarding the proportion of buildings which could be refurbished in an economically viable way and the potential returns on own capital are affected by the regional market situation, the technical condition of the buildings and current occupancy levels, they would be transferrable to similarly structured portfolios. The CO_2 reduction, economic viability and long-term investment risk comparison between EnEV 2014 and KfW 55 assuming full refurbishment will tend to be similar for all buildings due for full refurbishment.

Fig. 5: Potential bauverein refurbishment roadmap

By 2025, 20 out of 38 buildings could be refurbished in an economically viable way to EnEV 2014 standard, and 19 to KfW 55 standard.



If you would like to find out more about the project, please contact

bauverein AG Darmstadt
Mr. Thomas Lemmermeyer
Siemensstrasse 20
64289 Darmstadt, Germany
lemmermeyer@bauvereinag.de
www.bauvereinag.de

HEAG Südhessische Energie AG (HSE)/ENTEGA
Mrs. Silvia Meijer
Frankfurter Strasse 110
64293 Darmstadt, Germany
silvia.meijer@hse.ag
www.hse.ag

5.3
Further options for increasing the willingness to refurbish in the rented housing segment

Examples for further market related solutions

Innovative reassurance products such as KlimaProtect (see Profile 8.4) which offer to insure the energy savings promised could have a positive impact, as they shift the risk of a potential non-achievement of the expected energy cost savings, which can help the property companies with their budgeting and can also be useful in the dialogue with the tenants.

The Investor Confidence Project develops uniform assessment criteria and aims to reduce transaction costs through the standardisation identification, measuring, reporting and verification processes, and to increase investor and funder confidence in energy efficiency projects.

Potential support from policy-makers

Property companies can utilise energy performance contracting solutions (see Profile 7.2) in order to finance energy efficient refurbishment measures in a way that does not affect their balance sheets. These solutions also offer other advantages as contractors could be commissioned with running the operational side of the business, for example. **Improving the framework conditions for energy related services in general and energy performance contracting in particular** could therefore contribute significantly to closing the investment gap in this segment. (See Section 6 for more details on energy performance contracting).

A good idea for improving the communication with the tenants is the use of trained mediators and block managers. **Funding the employment of mediators**, for instance within the scope of the KfW funding programme number 432 for energy efficient urban refurbishment, "Energetische Stadtsanierung – Zuschüsse für integrierte Quartierskonzepte und Sanierungs-manager", would certainly be a welcome course of action.

To encourage the positive developments in the rented housing sector, the financing forum discussed whether **local authority directives and tenancy law should focus more on the issue of rents including heating costs and heating costs as such**.
A **general index of rents including heating costs** can make the heating costs more transparent for both the tenants and the local authority stakeholders and increase the demand for housing which has undergone energy efficient refurbishment.

Tenancy law currently focuses on rents excluding heating costs and on the right to increase the rent excluding heating costs in accordance with the costs incurred by building refurbishment. Limiting the rent including heating cost increases to the ration of the heating costs saved through the building refurbishment by adapting the tenancy law can lead to extremely uncertain legal situations. At the level of individual projects, it might make more sense to agree this between the parties. Implementation of the model project illustrated would therefore require the possibility of increasing the rents excluding heating costs by the amount of the heating costs saved. On the one hand, this would guarantee the economic viability of the planned refurbishments whilst on the other, it would ensure cost neutrality for the tenants. Essentially, the tenancy law and the regulations concerning operating costs should be reviewed under the aspect of how the interests of the tenants, landlords and the government could be served equally and how the cost and savings distribution keys could be designed in a sensible and fair way in order fulfil the demands of social responsibility, economic viability and the climate protection targets

Furthermore, the companies in the financing forum believe that **uniform**, **meaningful energy consumption passes** would contribute to improving the dialogue with the tenants, and to raising their awareness of the issue of energy efficiency.

The results of the model project and further analyses from effin workshops show that refurbishment on the basis of the currently applicable EnEV 2014 can represent an investment risk in the long term as the EnEv 2014 requirements are not compatible with the federal government's 2050 targets, and a second refurbishment would therefore be necessary before 2050. In particular, this also applies to new buildings erected today to EnEV 2014 standard as these will need to be refurbished by 2050. **Increasing the strictness of the legal directives to KfW 55 standard**, on the other hand, would be a helpful indicator with regard to the longevity of the measure and the long-term protection of the investments.

6
Commercial property segment

Potential in the commercial property segment

Approx. 1.7 million buildings in Germany are commercially used industrial production sites, office buildings, retail spaces and buildings that house accommodation and private education establishments. It should be noted that the building structure in the commercial property segment is extremely heterogeneous, and that the respective sub-segments each face specific challenges when it comes to energy efficient building refurbish-ment. In some sub-segments, the consumption groups affected by energy efficient building refurbishment (especially the heating and hot water supply) play only a marginal role. In the area of industrial buildings, for example, the actual plant and equipment frequently harbour a considerably higher optimisation potential which can be realised over shorter amortisation periods than investments into energy efficient building refurbishment. In the area of retail spaces (e.g. shopping centres), this similarly applies to the general technical equipment for lighting and ventilation. In the sub-segment of (let) office buildings, the challenges are not unlike those faced by the rented housing segment (see Section 5.1).

Overall, there are data gaps in the commercial property area, and the available data is extremely non-transparent, both where the building stock is concerned and also in terms of energy efficient refurbishment measures. Going by the feedback from the effin workshop participants, it seems safe to assume that the energy efficient refurbishment rate is currently extremely low.
In the commercial property segment, the energy efficiency of buildings tends to be an issue for new developments.
Any energy efficient refurbishment measures carried out are frequently lighthouse projects. An excellent example of this is the energy efficient refurbishment of the Deutsche Bank office towers in in Frankfurt am Main.[xvii]

Due to the unsatisfactory situation when it comes to data availability, the energy efficient refurbishment potential in the commercial property segment that needs to be exploited to reach the federal government's climate targets can only be estimated at an indicative, approximate 33 billion euros p.a. Assuming a currently low level of energy efficient refurbishment activities, the majority of this potential could probably still be realised. The greenhouse gas reductions necessary to reach the climate targets are estimated to amount to over 80 megatons of CO_2 p.a.[xviii]

Due to the relatively homogeneous user group and the synergy effects with the residential housing segment, the effin workshops focused on the segment's (let) commercial property and office building element. According to the data available, office buildings make up around 15% of the commercial property spaces taken into account by effin, and are responsible for a share of approximately 20 megatons of CO_2 per annum. The annual investment volume required to achieve a zero carbon office building stock amounts to approx. 5 billion euros p.a.[xix]

Potential in the commercial property segment	
Investment requirement	Approx. 33 billion euros p.a.; of this, approx. 5 billion euros annually in office buildings
Current investment volume	There are no actual current investment figures available; however, these are estimated to be low [ii]
Investment gap buildings	Up to 33 billion euros p.a. (indicatively); of this, approx. 5 billion euros annually in office
Buildings	~1.7 million non-residential buildings in Germany: industrial production sites, office buildings, retail spaces and buildings that house accommodation and private education establishments (indicatively).
Share of building sector CO_2 emissions	~31 %[iii]

6.1
Where let commercial property/office buildings are concerned, insufficient transparency regarding the potential harboured by the portfolio inhibits energy efficient refurbishment projects

The core challenges in the let commercial property segment element, in particular in the office building sub-segment, are not unlike those faced by the rented housing segment (see Fig. 6). This applies particularly to the major barrier of insufficient transparency when it comes to the potentials harboured by the portfolio. This can be addressed with the aid of the solution approach developed in the residential housing segment focused effin model project, "Development of a simple mechanism for assessing the economic viability of energy efficient refurbishment measures in the residential housing segment".
(See Section 5 for a detailed description of the model project and the assessment tool developed in its course).

When applying the assessment tool to let commercial property, the structural dimension of commercial leases has to be taken into account: where commercial tenancies are concerned, the law gives the energy performance contracting parties more scope in terms of contract design, which is also why in part different leases apply within one and the same portfolio.

On the one hand, this makes the economic viability assessment and the systematic implementation of energy efficiency measures more difficult but on the other, there is more scope for generating the investment costs associated with the energy efficient refurbishment measures through the rents. In time, the disadvantages posed by the extremely varied contract structures could be minimised through standardisation of the contract structures on the part of the commercial property owners. It should also be kept in mind that the KfW funding conditions applicable in the commercial property sector and taken into account in the economic viability calculations differ from those that apply in the residential housing segment.
The tool developed within the scope of effin for assessing the economic viability of investments in energy efficiency could be adapted accordingly.

Further relevant barriers to implementation were identified in the effin workshops and analysed from different perspectives. One major result arrived at by effin is the realisation that the

Fig. 6: Commonalities and difference commercial property and residential housing

	Let office buildings	Residential housing
Core parameter situation	✓	✓
Investor-user dilemma	(✓)	✓
Usually property portfolio management	✓	✓
Different degrees of professionalism	✓	✓
Legally guaranteed recharging of energy efficient refurbishment costs	✗	✓
Varying tenant and contract structures	✓	✗
No restrictions to contract design	✓	✗

financing of planned refurbishment projects is not one of the core barriers. As the effin workshop participants reported, the owners of commercial property frequently put forward the argument that "you always make money with a properly managed portfolio. So why should we make these investments?"

There are reservations due to the credit check triggered by a planned energy efficient refurbishment project. This can potentially have a negative effect on the commercial property company's balance sheet if individual buildings or entire portfolios are valued at a different or disadvantageous amount in the course of the check.

Overall, avoiding potential negative effects on the balance sheet is of paramount interest, and therefore also financing which does not have an effect on the balance sheet, for example through energy performance contracting (see Section 7.2 for more about energy performance contracting). As an innovative project in the energy performance contracting field, the SUSI Partners "Energy Efficiency Fund" represents an energy performance energy performance contracting offer tailored to the needs of commercial properties. The fund finances the investments in the energy efficient refurbishment of commercial properties in cooperation with a technology supplier that guarantees the fund a minimum energy saving. The majority of the resultant energy cost savings flow back into the fund, the commercial property owner retains a smaller part. The SUSI "Energy Efficiency Fund" thereby combines sustainable investment opportunities for institutional investors with the energy saving idea.

Those who rent commercial property or office space have no or only few incentives to urge their landlords to carry out energy efficient refurbishment, especially also because they are not aware of how much of their rent actually covers heating costs. Heating and other running costs are often not shown separately in commercial leases, although they are always an element of the rent charged. On the one hand, this is a disadvantage as an increased demand for energy efficient office space does not lead to any advantages. On the other hand, the investor-user dilemma that is so typical in the residential housing sector does not exist in the commercial property sector. The landlord profits directly from investing in measures that result in heating cost savings.

6.2
Further options for increasing the willingness to refurbish in the commercial property segment

All in all, all measures that

- Increase the transparency of the energy performance of an office space,
- Can be financed in a way that does not affect the balance sheet,
- Reduce transaction costs and insure against risks (of heating cost savings that do potentially not equal the amount envisaged)

may lead to increased refurbishment activity in the area of let commercial property/office buildings.

Examples for further market related solutions

Innovative reassurance products such as KlimaProtect (see Profile 7.3) which offer to insure the energy savings promised could have a positive impact, The risk of energy cost savings that potentially do not materialise is therefore transferred.

The Investor Confidence Project develops uniform assessment criteria and aims to reduce transaction costs through the standardisation identification, measuring, reporting and verification processes, and to increase investor and funder confidence in energy efficiency projects.

Potential support from policy-makers

Professional property management companies use energy performance contracting solutions (see Profile 8.2) as a means to finance energy efficient refurbishment measures in a way that does not affect the balance sheet. **Improving the framework conditions for the providers of energy related services** therefore contributes to closing the investment gap in this segment. (See Section 7.2 for more details on energy performance contracting)

Inherently, the structure of commercial leases means that tenants usually do not have a financial incentive to demand office space with a good energy performance. However, the project participants were of the opinion that the demand for office space with a good energy performance could be increased if the energy efficiency is communicated in a transparent way, e.g. the own customers are also aware of this fact. **Uniform, meaningful energy consumption passes and energy efficiency seals or certificates** could contribute to this. The various energy performance and consumption passes currently leads to inadequate comparability and the need for explanation. Existing certification approaches (e.g. DGNB, LEED) merely include energy efficiency as one of several factors in the certification. This leads to a continued non-transparency of the office building's energy performance and, from the tenants' perspective, there are hardly any incentives for upping the demand for energy efficient refurbishment.

7
Public authority segment

Potential in the public authority segment

Approx. ~106,000 buildings in Germany are public authority buildings in the areas of education, administration or sports. To achieve the federal government's targets, a reduction potential of 9 megatons of CO_2 per annum would have to be realised in this particular building stock. This equals an investment requirement into energy efficient refurbishment of ~3.3 billion euros p.a. of which currently, less than 0.6 billion euros p.a. are spent, which equals just under a fifth. The investment gap and therefore the additional, so far unexploited market potential for refurbishing the buildings in the public authority segment in accordance with the federal governments targets amounts to ~ 2.7 billion euros a year.

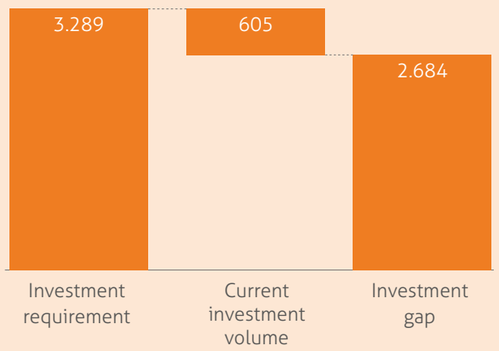
Public authorities are also particularly called on to set an example and to send out a signal by refurbishing public buildings to improve their energy efficiency. So far, the public authorities are not fulfilling their respective duties: public authorities currently only spend 18% of the investment requirement, against the 42% already spent in the residential housing segment.

The current political developments point towards stricter directives regarding the energy efficient refurbishment of the public authority building stock:

- The refurbishment rate for government-owned buildings is supposed to be increased to 3% since 2014, in line with the implementation of the EU Energy Efficiency Directive (EED).
- The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety's "Climate Action Programme 2020" intends to develop the strategy for climate friendly building and living further, and to develop refurbishment roadmaps for property owned by the government, and to support the regional and local authorities in the development of refurbishment roadmaps for property owned by them. It was passed by the cabinet in December 2014.
- The National Action Plan on Energy Efficiency (NAPE) coordinated by the Federal Ministry for Economic Affairs and Energy (BMWi) contains "immediate measures in the building sector" and was passed by the cabinet in December 2014.
- The federal government has commissioned the BMWi with overseeing the development of an "energy efficiency strategy for buildings", to be presented by the end of 2015.

In light of these developments, an analysis was carried out within the scope of the effin project to determine why so far, the volume of refurbishment activities carried out by local authorities and public institutions is comparatively low, and why they are not fulfilling their duty to act as pioneers and role models in this area, and which solution ideas there are for increasing the refurbishment activity soon to ensure compatibility with the targets.

Potential in the public authority segment



Buildings	~106,000 public buildings, educational establishments, offices and sports halls (indicative) Not taken into account due to the marginal importance of the cumulated heating requirements or the absolute number of buildings: warehouses, cultural venues, leisure centres and buildings associated with health services
Share of building sector CO_2 emissions	3,6 %[i]

[3] Own calculations based on dena (2012), IWU (2010, 2011, n.d.)

7.1
To increase the energy efficient refurbishment quota further, the financial scope of "deficient" and "depressed" local authorities must be extended

Approx. 94% of public buildings are owned by the local authorities. In the effin project's experience, these can be divided into three segments: "stable", "deficient" and "depressed" local authorities. "Stable" local communities are those that managed to balance their budget or even over performed throughout the past 3–4 years (at least from time to time). Although they did not manage to balance their budgets or to over perform, the local authorities deemed "deficient" still managed to pay their debts without external help, in contrast to the "depressed" local authorities.

The workshops within the scope of effin have shown that "stable" local authorities are frequently already very active in the area of energy efficient refurbishment and use a number of different financing instruments for this. This speaks for both great skill in the selection of refurbishment projects and contributory service providers and also for well-organised internal processes with clearly defined responsibilities in the refurbishment process (e.g. central energy department). "Stable" communities also often apply for the funding available and profit from the reduction of their ongoing energy costs. These examples show that fundamentally, energy efficient refurbishment is attractive for the public authorities.

Going by the experience from the effin workshops, "deficient" and "depressed" local authorities refurbish considerably less. The main barrier is insufficient access to investment capital. These local authorities do not have adequate capital resources, meaning that it is also often not possible for these local authorities to claim subsidies as KfW funding is not granted if there is not at least some own capital. Although the own capital contribution for financially weak local authorities that do not have enough capital resources can be reduced to 5% of the costs eligible for funding in individual cases, even this own capital contribution represents a difficult hurdle. Where applicable, this limits the refurbishment activities to individual measures as full refurbishments with an overall higher investment volume can simply not be managed. The situation can be particularly dramatic for some "depressed" local authorities that can no longer take out any loans at all.

Too little internal awareness of the refurbishment potentials and the services offered by the respective service providers and challenges in terms of coordinating the various different internal parties involved in a refurbishment project were named as further barriers in the effin workshops. This is again indirectly a consequence of the budget constraints as qualified experts cannot be employed, and consultants or experts cannot be commissioned.

7.2
Existing innovative approaches can make additional financing despite budget constraints possible

Examples for further market related solutions

Innovative financing options for public authorities are already being taken up, albeit infrequently. However, as yet they are not taken up across the board, their potential is also not fully exploited. Such approaches include, for example, "intracting", external contracting, energy efficiency cooperatives, crowdfunding, e.g. in the form of loans provided by the local citizens, or energy efficiency performance guarantees. The advantages for the different types of local authorities are explained in the following.

"Intracting" (internal contracting), for example, as developed and implemented by the city of Stuttgart (the "Stuttgart Model") is a conceivable option for a potential financing model, or contracting. For local authorities, contracting also offers the advantage of financing without own capital and it also, potentially, eases the strain on the budget either immediately or at least in the medium-term through the reduction of the ongoing spending on energy. The local authority does not have to develop in-house expertise to accompany the refurbishment project.

In the case of "intracting", the contracting does not involve an external contractor but an internal "intractor". "Intracting" is therefore also suitable for smaller projects for which an external contracting model would be too elaborate. It involves accumulating a pot of money in the budget that is used exclusively to finance energy efficient refurbishment measures. Energy costs saved through the measures are then transferred back into this "interacting" pot until the investment has been fully repaid. "Interacting" can be used by local as well as regional authorities or the government.

"Interacting" is primarily of relevance to "table" local authorities. Due to their lack of capital, "deficient" local authorities can only sometimes use this method, whilst it is impossible to use for "depressed" local authorities. Contracting is an interesting option for all sorts of refurbishment strategies. It is suitable for both comprehensive energy efficient refurbishment measures and individual measures such as, for example, exchanging pumps (see Profile 8.2).

Despite the convincing advantages that contracting offers, also to financially worse off local authorities, its implementation in in the local authority area is limited by barriers resulting from, for instance, the public contracts directive. The public contracts directive considers investments into new heating systems as construction work. If a heating system is to be modernised within the scope of a contracting agreement, it is no longer considered construction work but comes falls the public contracts directive pertaining to services. As not only the installation of the heating system but also the energy supply is examined over the term of the contract, the value of the contracting agreement therefore soon exceeds the threshold after which the contract is subject to the EU public procurement rules, and tenders must be invited EU-wide. This is fundamentally unacceptable and puts local authorities off making these investments. The use of contracting solutions therefore remains restricted to an extremely limited area and below their potential as on the one hand, small projects are not considered as they are not financially viable for an external contracting provider and on the other, some larger projects are shelved by the local authorities due to the requirement of putting them out to tender EU-wide.

Excursus Box 3: Excursus on contracting

Contracting refers to a property owners transferring work which needs to be carried out to improve the energy performance of their property to an external service provider, the so-called contractor. The contractor develops an energy performance improvement concept and plans and realises the measures needed to improve the energy efficiency. The contractor is usually responsible for all of the necessary investments, looks after the maintenance of the system technology and is also responsible for any repairs. The investment costs amortise for the contractor through the energy cost savings achieved. The terms of the contract determine whether the property owner also receives a share of the cost savings.

The innovative model of crowdsourcing, for example in the form of a loans provided by the local citizens, is another external financing option for local authorities. This is one way to address the primary barrier of a lack of access to (third party) capital. Crowdfunding utilises the citizens' emotional connection with the refurbishment project ("my kids' school") (see Section 7). These models can be realised through the involvement of third parties acting as banks. The legal requirements for local authority crowdfunding are governed primarily by local government law, banking law and the Länder's regional constitutions. According to these, a local authority and its citizens may not enter into a loan agreement directly. Operators of web portals such as *www.leihdeinerstadtgeld.de* or *www.bettervest.de* often act as the gateway between local authority, citizens and bank. Citizens can pay money into a trust account at the bank via these web portals. Once the loan amount previously defined by the local authority has been reached, the bank enters into a loan agreement with the local authority. The bank then assigns the debt to the citizens according to the amount they have contributed. The bank continues to be involved in the role of credit settlement manager.

A further option for external financing which can be used by all types of local authorities are energy efficiency cooperatives. Besides financing that does not affect the budget, these also offer other services from information and advice to carrying out the operational side of the investment. Just like crowdfunding, they also are also based on a regional approach.

Unlike a contractor, however, a cooperative's primary objective does not lie in making a profit (see Profile 8.2).

As described in Section 7.2, budgetary constraints usually prevent the employment of qualified experts or the commissioning of experts and potentially limit the refurbishment activities to individual measures. In this situation, the KfW funding programme 432 for urban energy efficient refurbishment "Energetische Stadtsanierung – Zuschüsse für integrierte Quartierskonzepte und Sanierungsmanager" can help.
It subsidises comprehensive district-related energy efficiency concepts (energy efficient building refurbishment, efficient energy supply systems, and the promotion of renewable energy) and implementation management (a refurbishment overseer). In this context, an refurbishment overseer is responsible for the planning, the concept realisation, the activation and the networking of those involved, and the coordination and supervision of the measure implementation. At the same time, this overseer is the designated contact person for all questions related to financing and funding.

Planning energy efficiency projects can be made easier for all types of local authorities through innovative approaches such as the performance guarantee for energy efficiency measures given by KlimaProtect (see Section 8.3). Should the expected energy cost savings fail to materialise, this kind of insurance ensures that this does not have a negative impact on the local authority's finances.

Additional support for local authorities from policy-makers

Due to the central role contracting plays, or could potentially play, in the public authority segment, those involved in the effin project believe that particularly improving the framework conditions for energy related services would be important for increasing the refurbishment rate. In this context, individual points of the public contracts directive or procurement law should be reviewed with respect to the extent they potentially discourage the use of contracting.
In addition, the disadvantages contracting models are subject to in the context of applying for funding should be revised. Improving the framework conditions for contracting would particularly benefit deficient and depressed local authorities, as contracting possibly represents the best or only option for financing sensible energy efficiency projects for these authorities.

8
Further innovative approaches

To address the barriers in the four segments, various innovative approaches were presented in several workshops within the scope of effin, and developed further or clearer defined.

At this point, we would like to introduce some of these projects, chosen in the course of an effin workshop that focused on innovations.

Please refer to the website *www.effin.info* for a full list of the ideas and project descriptions.

8.1
Internet-based crowdfunding platform to finance energy efficiency projects

bettervest
nachhaltig · effizient · rentabel

bettervest GmbH: the first crowdinvesting platform for energy efficiency projects

Cooperation partners:

+ *www.polarstern-energie.de* (eco-power suppliers)
+ B.A.U.M. consulting and energy efficiency network
+ Peter Heinzel (energy advisor)
+ Adel und Link (press agency)

Innovation character/competitive advantage of the project/offer

Citizen financing via crowdfunding as a simple and transparent way to support projects with the aid of a self-developed web platform. The project owners agree to pay a major share of the annual cost savings back to the citizen investors over a set period until the investment amount plus a return has been paid out. Once the agreed term expires, the project owner then retains the savings in full. The platform is financed through the receipt of a percentage of the investment sum and also of the savings achieved by way of a commission.

Target group

Medium-sized enterprises, associations, public authorities and energy efficiency investors.

Brief description of the new offer

bettervest is the world's first investment platform designed to allow an investment community consisting of citizens to invest amounts from 50 euros upwards into energy efficiency projects carried out by renowned companies, local authorities, associations and institutions in return for a financial share of the savings achieved. The bettervest platform therefore opens up the energy efficiency market and make it accessible to private investors. These ring-fenced project funds are then used for ecologically and economically sensible energy efficiency measures that lead to cost, energy and CO_2 savings. The measures financed in this way will be designed and calculated by certified energy advisors and are regularly monitored across the agreement term.

Need and difficult issue addressed

Although the cost effectiveness of energy efficiency projects is a given, many projects are not implemented due to various barriers identified by effin. Funding that is available does not reach the refurbishers. In this respect, betterinvest partially closes the gap as it circumvents the barrier of own capital availability and increases the confidence in the success of the energy efficiency measure as a review by a qualified energy advisor is an integral part of the offer.

Contact details

Address: Schweizer Strasse 28, 60594 Frankfurt, Germany
Name of authorised representative: Mr. Patrick Mjinals
Contact: mail@bettervest.de, *www.bettervest.de*

8.2
Establishment of regional energy efficiency cooperatives (REEG)

Bundesdeutscher Arbeitskreis für Umweltbewusstes Management – B. A. U. M. e. V. (National Green Management Working Group)

Cooperating partners at a national level are the existing B. A. U. M Zukunftsfonds e. G. fund in Hamburg and B. A. U. M. Consult Umwelt- und Energieberatung, plus B.A.U.M. member companies as the technology providers. At a regional level, the cooperation partners are the local authorities (including public utility suppliers and regional business development organisations), the regional or local economy and its associations as well as churches, societies and individual citizens.

Innovation character/competitive advantage of the project/offer

The innovation lies in the fact that the regional powers – local authorities, the local economy and the local citizens – address the issue of energy efficiency together and independent of the government. REEG are regional initiatives for the region. REEG users benefit from a comprehensive bundle of services from information and advice to carrying out the operational side of the investment as well as financing that does not affect the budget or local authority finances. This differentiates REEG from banks, which only make the financing available, and this to the detriment of the borrowing limit or rating. REEG differ from contractors because they work on a pure cost recovery basis, and their primary intention is not the generation of profits, and also because of the explicitly stated intention of keeping the value creation in the region in as far as possible. The REEG concept is therefore new in the market and features some unique characteristics.

Target group

The REEG respectively have three target groups: companies, local authorities (community institutions) and private households (including church and association organisations).
All target groups offer considerable energy efficiency potential.

Brief description of the new offer

On the basis of the concept of a "Zukunftsfonds" future fund publicised by its chairman, Prof. Dr. Maximilian Gege, B. A. U. M. e. V. has developed a cooperative model that focuses mainly on the promotion of energy efficiency in companies, local authority institutions and private households – rather than, like other already established models, on the promotion of renewable energy. To this end, the B. A. U. M. Zukunftsfonds e. G. was set up at a national level. Within the scope of a pilot project funded by the BMUB (term 10/2013–3/2016), the model is now to be transferred to a regional level. For this purpose, respective regional energy efficiency cooperatives will be established under the umbrella REEG (Regionale EnergieEffizienz¬Genossenschaften) in three pilot communities.

Need and difficult issue addressed

Energy efficiency is the energy turnaround's "sleeping giant". There are two main barriers preventing the implementation of energy efficiency measures that make economic and ecological sense: a lack of information and, in consequence, a lack of the means to finance them. The REEG solves both problems.
It carries out energy efficient measures on its own account and with qualified expertise, primarily in companies and public authority institutions. The refinancing is obtained through the savings, in which the customer has a share right from the start.

Contact details

Address: Osterstrasse 58, 20259 Hamburg, Germany
Name of the authorised representative: Mr. Herbert Koepnick, Project Manager; Mr. Peter Krabbe, CEO B. A. U. M. Consult Hamburg
Contact: herbert.koepnick@baumev.de, *www.baumev.de*

8.3
PumpenEnergieSpar-Contracting – pesContracting®

pesContracting GmbH

Cooperation partners:

+ Grundfos
+ Various licensed and premium partners in Germany, Austria and Switzerland

Innovation character/competitive advantage of the project/offer

An operator of old pumping systems can save money and energy without investment. There is no other possibility anywhere else in Germany to exchange pumping systems in this way.

Target group

All pumping system operators wanting to profit from energy-saving pumping technology and operating safety thanks to a 5-year-all-inclusive bundle. Besides industrial and manufacturing sector companies, the offer addresses especially local authority owned companies and institutions, for instance

Focus companies:

+ Industrial companies
+ Manufacturing companies
+ District heating networks
+ Local authorities (water suppliers, sewage works etc.)
+ Large properties
+ Leisure centres and spas

Brief description of the new offer

"Saving energy and money without investing either"– PumpenEnergieSpar-Contracting offers measures to save energy through a financing option that does not impact on costs. The bundle contains a 5-year-all-includinve bundle (annual maintenance, repairs, remote monitoring, 24-hour emergency service). pesContracting® is financed by 90% of the energy saved thanks to the exchange. It therefore allows operators to replace their old energy guzzling pumping systems without any investment. In addition, they not only profit from the 5-year-all-inclusive bundle but also from the energy saving, of which they receive a 10% share.

Need and difficult issue addressed

The energy consumption of pumping systems is to be reduced. In many cases, the operators of the respective pumping systems do not have any investment capital and can therefore not carry out their energy efficient refurbishment.

Contact details

Address: Rainer Strasse 1, 94345 Obermotzing/Aholfing, Germany
Name of authorised representative: Mr. Oliver Handschuh
Contact: info@pescontracting.de, *www.pescontracting.de*

8.4
Energie Einspar Protect (EEP) – performance guarantee for energy efficiency improvement measures

KlimaProtect – a b2b Project GmbH brand

Innovation character/competitive advantage of the project/offer

It has so far not been possible to guarantee the actual amount successfully saved through energy efficient refurbishment. Stakeholders had to rely more or less blindly on the calculations made by suppliers within the scope of profitability analyses. It is hardly surprising that this uncertainty did little to increase the potential stakeholders' confidence. Numerous cost effective energy efficiency measures were therefore not implemented – simply due to a lack of trust on the customer side. This is the point addressed by the new insurance product "Energie Einspar Protect" (EEP). EEP was developed in collaboration with renowned insurance companies and suppliers and is extremely easy to adapt to the respective insurance needs.

Target group

The offer addresses all suppliers of products and services in the "energy efficiency" area. Regardless of whether they are a contractor, a manufacturer or a consultancy firm. EEP can equally applied to a wide range of difference measures. Improving the building envelope, efficient lighting, heating or cooling systems and even "innovations" in the area of energy efficiency may be insured.

Brief description of the new offer

An energy efficiency measure provider promises the refurbisher a certain amount of savings. To ensure that the provider does not have to bear the risk resultant from this guaranteed promise, the amount promised can be insured by an insurer with the product Energie Einspar Protect. Should the savings fail to reach target, the refurbisher is paid money by the insurance company. This guarantees that savings that do not materialise do not have a negative financial impact on the refurbisher.

Need and difficult issue addressed

The aim of KlimaProtect with EEP is to increase the confidence of refurbishers in energy efficient refurbishment measures and in the cost savings promised. This allows measures that make economic and ecological sense to be carried out quicker and more frequently.

EEP gives investors the reassurance that the investments cannot turn out to have been misguided due to the non-achievement of savings. This makes it easier for them to decide to invest as the risk has been transferred to an insurance company. Claims can still be made even in the event of refurbisher bankruptcy.

Offer's added value from the stakeholder perspective

The refurbisher no longer depends on the provider and, potentially, their financial performance if the promised savings are not achieved. In the case of loss, i.e. non-achievement of the savings targets, the insurance will pay a respective compensation. The customer confidence increased through the EEP is a strong sales argument for the providers and results in a differentiation from competitor offers.

Financial services providers wishing to be able to offer comprehensive advice on energy efficient refurbishment measures also benefit from EEP. EEP allows them to offer all-round security to the end customer. Because if the savings are less than anticipated, the insurance pays. The financing can therefore continue as agreed beforehand – even if the savings are not achieved.

Contact details

Address: Rathausstr. 13b, 31134 Hildesheim, Germany
Name of authorised representative: Mr. Malte Johannes
Contact: malte.johannes@klimaprotect.de, *www.klimaprotect.de*

Notes

[i] Federal Government (2014)
[ii] WWF (2009)
[iii] Federal Government (2010)
[iv] IWU (2011); BMVBS (2011); Federal Government (2010)
[v] National Action Plan on Energy Efficiency (NAPE), Federal Republic of Germany, BMWi (2011)
[vi] dena (2012); IWU (2010, 2011)
[vii] Own calculations based on IWU (2007, 2010, 2011); dena (2010, 2012); BMVBS (2012); BEI (2011); DB Research (2011); BayernLabo; Investitionsbank SH; Bundestag printed paper 17/20426; EIB (2011); Forschungszentrum Jülich (2012); Prognos (2013); DIE (2008); StaBu (2012a); www.hochschulkompass.de; www.katholische-schulen.de; www.ekd.de; Ernst & Young (2012)
[viii] Own calculations based on dena (2012), IWU (2010, 2011, n.d.)
[ix] DSGV (2013)
[x] LBS West
[xi] IWU (2010, 2011), dena (2012)
[xii] Own calculations based on dena (2012), IWU (2010, 2011, n.d.)
[xiii] Own calculations based on IWU (2007, 2010, 2011); dena (2010, 2012); BMVBS (2012); BEI (2011); DB Research (2011); BayernLabo; Investitionsbank SH; Bundestag printed paper 17/20426; EIB (2011); Forschungszentrum Jülich (2012); Prognos (2013); DIE (2008); StaBu (2012a); www.hochschulkompass.de; www.katholische-schulen.de; www.ekd.de; Ernst & Young (2012)
[xiv] IWU (2011)
[xv] IWU (2010, 2011, o. J.), dena (2012), The CO-Firm
[xvi] Own calculations based on dena (2012), IWU (2010, 2011, n.d.)
[xvii] Deutsche Bank (2011)
[xviii] Own calculations based on dena (2012), IWU (2010, 2011, n.d.)
[xix] Own calculations on the basis of IWU (2007, 2010, 2011); dena (2010, 2012); BMVBS (2012); BEI (2011); DB Research (2011); BayernLabo; Investitionsbank SH; Bundestag printed paper 17/20426; EIB (2011); Forschungszentrum Jülich (2012); Prognos (2013); DIE (2008); StaBu (2012a); www.hochschulkompass.de; www.katholische-schulen.de; www.ekd.de; Ernst & Young (2012)
[xx] Cf. dena (2007)
[xxi] KfW funding programme for urban energy efficient refurbishment "Energetische Stadtsanierung – Zuschüsse für integrierte Quartierskonzepte und Sanierungsmanager" funding conditions

Legal Notices

Deutsche Unternehmensinitiative
Energieeffizienz e.V. (DENEFF)
Kirchstrasse 21
10557 Berlin
www.deneff.org

WWF Deutschland
Reinhardtstrasse 18
10117 Berlin
www.wwf.de

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Authors/Contacts

Dr. Erika Bellmann (WWF Germany), erika.bellmann@wwf.de
Susann Bollmann (DENEFF), susann.bollmann@deneff.org
Martin Bornholdt (DENEFF), martin.bornholdt@deneff.org

Academic Consultants

Dr. Nicole Roettmer (The CO-Firm)
nicole.roettmer@co-firm.com

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