10 YEARS BPIE

HUMBOLDT-VIADRINA Governance Platform

HEALTH AND WELL-BEING BENEFITS IN OWNER-OCCUPIED BUILDINGS

The building sector is responsible for almost 35% of Germany's final energy consumption [1], so it offers great energy-saving potential and opportunities for CO2 reduction through increased energy efficiency. However, recent policy instruments and the new measures of the 2019 climate policy package do not do enough to increase the rate of energy-related renovations of existing buildings. So-called 'deep' renovations – significant renovation projects with energy savings of over 60% – are currently only being carried out at a rate of 0.1% per year [2]. This briefing addresses the question of how to accelerate energy efficiency improvements in owner-occupied homes by also considering the numerous non-energy benefits they can bring.

In contrast to tenants, who only have an indirect influence on their housing situation, homeowners can initiate renovation measures themselves – and thus simultaneously achieve energy savings and increase the value of their property [3]. In addition, deep renovation works can bring other benefits including improved indoor air quality and increased comfort. Nevertheless, the annual renovation rate of owner-occupied detached and semi-detached houses is still below the 3% needed to achieve national climate targets [4].
What are the reasons for this?

Multiple benefits of renovation in owner-occupied buildings

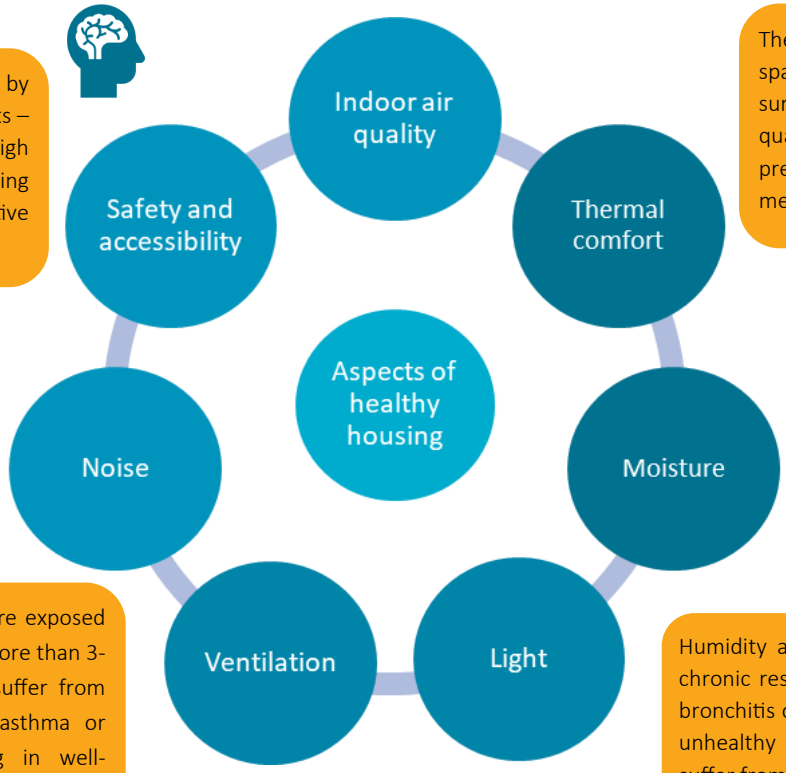
Benefits from the owner's perspective	Benefits from the resident's perspective
• Value enhancement • Risk reduction (compatibility with higher future performance requirements) • Climate protection	• Health improvements • Increased thermal comfort • Improved indoor air quality • Energy savings

Residents of owner-occupied buildings can receive double benefits from energy efficiency improvements

A lack of financial resources is often cited as the main obstacle to increased renovation activity, but there is also the fact that society is not fully aware of the multiple benefits of energy-efficient renovation measures can offer. As well as reduced energy costs, these include the health benefits of improved indoor air quality, better (day) light exposure, and reduced noise. While these factors are mentioned by some energy information services [5], they are often not made sufficiently explicit. In order to raise awareness of the additional advantages of renovation – and ultimately to increase the rate of refurbishment of residential buildings – these other benefits should be clearly measured and communicated widely by energy consultants and through digital information portals.

Improved health and thermal comfort through building renovation

Unhealthy housing conditions caused by low temperatures, mould and draughts – as well as stress and fear due to high energy costs and an insecure housing situation – can also lead to negative impacts on mental health [6].



The thermal environment of living spaces can directly affect blood pressure. An improvement in thermal quality can significantly reduce blood pressure as well as medication treatment and hospital stays [7].

Children and adolescents who are exposed to moisture in living spaces for more than 3-5 years are twice as likely to suffer from chest or breathing problems, asthma or bronchitis than children living in well-insulated and ventilated homes [7].

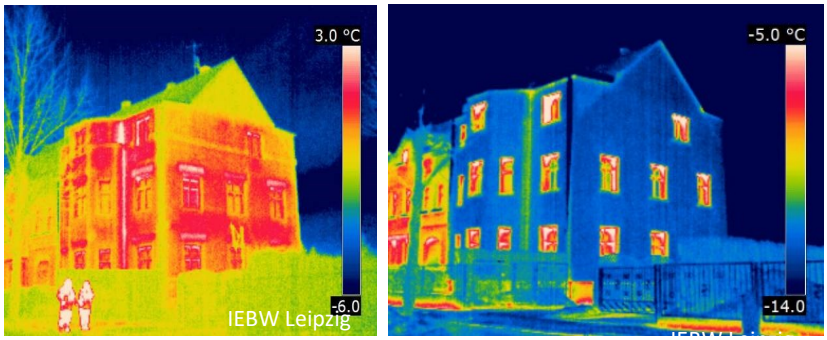
Humidity and mould can lead to acute and chronic respiratory diseases such as asthma, bronchitis or whooping cough, with people in unhealthy homes being 40% more likely to suffer from asthma [7].

Health and well-being benefits can help drive renovation decisions

If homeowners are made aware of the full range of benefits of renovating their homes, they are likely to initiate deep renovation measures more quickly. Various sources – such as energy advisory services, websites and manufacturers – can provide information about the significant health benefits of energy-related renovation. Even if standard measures are not yet available, owners should still have access to pilot studies and information. A recent survey showed that factsheets or examples of best practice can be enough to influence individual decisions in favour of deep renovation measures [5].

How can the benefits of energy efficiency improvements be better communicated?

- Comprehensive (before/after) **monitoring of air quality, moisture and airtightness** can illustrate the positive effects of renovation activities.
- A **visual representation** of the improved thermal performance – and, if possible, the health effects – helps to make the benefits of renovation more tangible.
- Creating an **emotional connection** between energy-efficient renovation and an improved quality of life can lead to an increase in renovation measures.



Thermographies today mainly visualize the actual state of a building. A before-and-after comparison is only possible over a longer period of time after completion of the renovation.

Source: DEN e.V. Landesverband Sachsen (German Network of Energy Consultants), IEBW Leipzig

Quality-assured energy advisory service

Independent energy advisory services can help to identify cost-effective renovation measures, although limited budgets often mean thermal images are not made. However, 2020's increase in subsidies for energy counselling in residential buildings – 80% of the counselling costs are now covered[1] – could lead to more energy counselling, where thermographic images should be taken if possible.

[1] The maximum funding amounts to €1,300 for detached/ semi-detached houses and €1,700 for multi-family buildings.

How can building renovation roadmaps and energy performance certificates help?

Due to the lack of clear quantification methods and indicators, current instruments for planning renovation measures and assessing building energy performance do not yet include health and comfort parameters. Nevertheless, these benefits – such as improved indoor air quality and thermal comfort – are sometimes mentioned under 'other aspects', and they have been qualitatively included in some European research and pilot projects (e.g. the Horizon 2020 project iBRoad). At the European level the X-tendo project is also developing ways of including comfort and health criteria in energy performance certificates. The European Commission is analysing the feasibility of introducing a digital building renovation passport, which could also contain information on multiple benefits (EPBD 19a).

X-tendo Project

The Horizon 2020 project X-tendo is developing 10 innovative features for a new generation of energy certificates. Among other things, an online toolbox will be made available to authorities and certifiers. A comfort criterion will also be developed in detail. The project is contributing to **improved reliability, usability and consistency** in European energy certificates.

iBRoad Projekt

The aim of the European iBRoad Horizon 2020 project is to develop an **innovative tool for the creation of renovation roadmaps**, which lists individual renovation measures and their effects. In addition, the project has developed a building logbook that contains all building-relevant data and previous renovation steps in a digital format.

EPBD 19 a—Feasibility Study of Building Renovation Passports

On behalf of the European Commission, a feasibility study on the introduction of building renovation passports in the EU member states was carried out. In a survey of experts, industry representatives and other stakeholders, over 90% of respondents rated **information on comfort and indoor air quality** as "important" to "very important".

Policy recommendations:

1. Comprehensive monitoring of the renovation works by energy advisors before, during and after completion of the measures should be ensured in order to guarantee and demonstrate improved indoor air quality. Measurements after energy-related renovation projects can make the positive impacts for homeowners more tangible and should be financially supported (e.g. KfW support). Energy advisory services should be obligated to explicitly point this out.
2. Financial support programmes should give greater support to deep renovation projects - including serial renovation projects such as those based on the Dutch Energiesprong concept - provided that improved energy efficiency and added micro- and macroeconomic benefits can be demonstrated by a standardised monitoring process.
3. Pilot projects for the development of quantification methods and systematic data collection should be strongly encouraged and facilitated. This requires productive, trustful cooperation between academia, politics, civil society and business. Digital building logbooks or the targeted use of building information modelling (BIM) to collect data on health and comfort improvements are promising approaches that should be tested in practice on a large scale. The German Individual Renovation Roadmap (Individueller Sanierungsfahrplan, iSFP) must also be further developed with regard to the multiple benefits.

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[9] Horizon 2020 Project iBRoad— https://ibroad-project.eu/

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The factsheet builds on the results of the project „Multiple benefits as driver of energy efficient building renovation" which can be found on the project webseite and here.

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The Buildings Performance Institute Europe is a European not-for-profit think-tank with a focus on independent analysis and knowledge dissemination, supporting evidence-based policy making in the field of energy performance in buildings. It delivers policy analysis, policy advice and implementation support.

Buildings Performance Institute Europe
Sebastianstraße 21, D-10179 Berlin
Rue de la Science / Wetenschapsstraat 23, B-1040 Brussels