

# Integrating sufficiency and energy efficiency in rental housing

Eva-Maria Grommes<sup>1,\*</sup>, Leonie Bremer<sup>2</sup>, Valérie Varney<sup>1</sup>, Ulf Blieske<sup>2</sup>

<sup>1</sup> Cologne Innovation and Transfer Lab, University of Applied Sciences Cologne, 50968 Köln, Germany

<sup>2</sup> Cologne Institute for Renewable Energy, University of Applied Sciences Cologne, 50968 Köln, Germany

\* Corresponding author: Eva-Maria Grommes, [Eva-Maria.Grommes@th-koeln.de](mailto:Eva-Maria.Grommes@th-koeln.de)

## CITATION

Grommes EM, Bremer L, Varney V, Blieske U. Integrating sufficiency and energy efficiency in rental housing. *Energy Storage and Conversion*. 2025; 3(2): 2104. <https://doi.org/10.59400/esc2104>

## ARTICLE INFO

Received: 20 November 2024

Accepted: 12 March 2025

Available online: 15 May 2025

## COPYRIGHT



Copyright © 2025 by author(s).

*Energy Storage and Conversion* is published by Academic Publishing Pte. Ltd. This work is licensed under the Creative Commons Attribution (CC BY) license.

<https://creativecommons.org/licenses/by/4.0/>

**Abstract:** This study examines the application of sufficiency practices in rental housing with a focus on enhancing energy efficiency. In particular, it considers how rental market structures influence tenants' energy use behaviors. Given that rental housing represents a substantial proportion of urban residential buildings, it is imperative to gain insight into the dynamics between landlords and tenants in order to effectively manage energy usage. The research methodology employs a combination of literature review, chatbot-based surveys, and expert interviews to gather insights from tenants and landlords, with the objective of identifying practical strategies to support energy-efficient living. The findings indicate a significant interest among tenants in energy-saving practices, underscoring the pivotal role of landlords in disseminating information about energy efficiency measures. However, the prevailing market structures frequently constrain tenants' ability to implement significant energy savings. The implementation of supportive policies, particularly those that encourage landlords to undertake energy-efficient retrofits, is identified as a crucial means of facilitating tenant engagement. The study concludes with policy recommendations that emphasize the necessity of both tenant engagement and landlord accountability in promoting energy-efficient behaviors. These insights are intended to inform the development of future retrofitting standards and policies that foster a more sustainable rental housing market.

**Keywords:** sufficiency; energy efficiency; rental housing; energy policy; tenant engagement; building retrofitting; private housing market

## 1. Introduction

The key sectors for complying with the *Paris Agreement* are energy, industry, transport and buildings. In these sectors, greenhouse gas neutrality must be at least largely achieved by 2035 [1]. With 115 million tonnes of CO<sub>2</sub> in 2021, the building sector is the largest greenhouse gas emitter in Germany after the energy, industry and transport sectors. Across Germany, the building sector accounts for 35% of final energy consumption and around 28% of CO<sub>2</sub> emissions [2]. The *Climate Protection Act 2020* requires the building sector to reduce annual CO<sub>2</sub> emissions by around 53 million tonnes of CO<sub>2</sub> by 2030 compared to 2020 [3].

In 2022, energy consumption in the residential sector has gained new attention due to the conflict in Ukraine and the energy crisis. As a result of the sharp rise in energy costs, 48% of the German population in March 2022 stated that they had changed their electricity and heating consumption since the conflict in Ukraine, and were behaving more frugally [2].

The growing focus on sufficiency in Germany is linked to individual actions aimed at reducing energy consumption, driven by the urgency of climate goals and recent energy crises. While energy-saving practices are often encouraged through

individual behavior, there remains a significant research gap regarding the support structures necessary to enable such behaviors, especially in the rental housing sector. Tenants of rental housing, who constitute over half of the German population, frequently lack direct control over the structural or energy-efficiency aspects of their living environments. For these tenants, the capacity to engage in energy-sufficient practices often depends on factors outside their control, such as the building's insulation quality or heating systems, which are typically managed by landlords or housing corporations [4]. Although these measures appear to be primarily efficiency-focused, they can nevertheless affect the sufficient behavior within the rented accommodation. For instance, some tenants may be unable to reduce the heating more frequently if their building is poorly insulated.

This study examines the pivotal role of landlords in facilitating energy sufficiency within the rental housing sector in Germany, which serves as a case study. It is evident that landlords are able to influence tenants' capacity to adopt energy-efficient behaviors through the implementation of energy-saving improvements, such as upgrades to insulation or heating systems.

Tenants are the primary beneficiaries of reduced energy bills, yet landlords often lack the motivation to invest in such improvements. Conversely, tenants may be disinclined to invest in energy-efficient practices or upgrades due to their lack of ownership and the relatively short-term nature of their occupancy. This misalignment of financial incentives between landlords and tenants can result in underinvestment in energy efficiency measures in rental properties, perpetuating higher energy consumption and costs [5].

Nevertheless, the existing literature has not yet fully explored the relationship between landlord decisions, tenant energy practices and the structural enablers of sufficiency. This study addresses this gap in the literature by investigating how landlords' choices, particularly regarding heating, energy storage and conversion systems, impact tenants' energy-saving capacities.

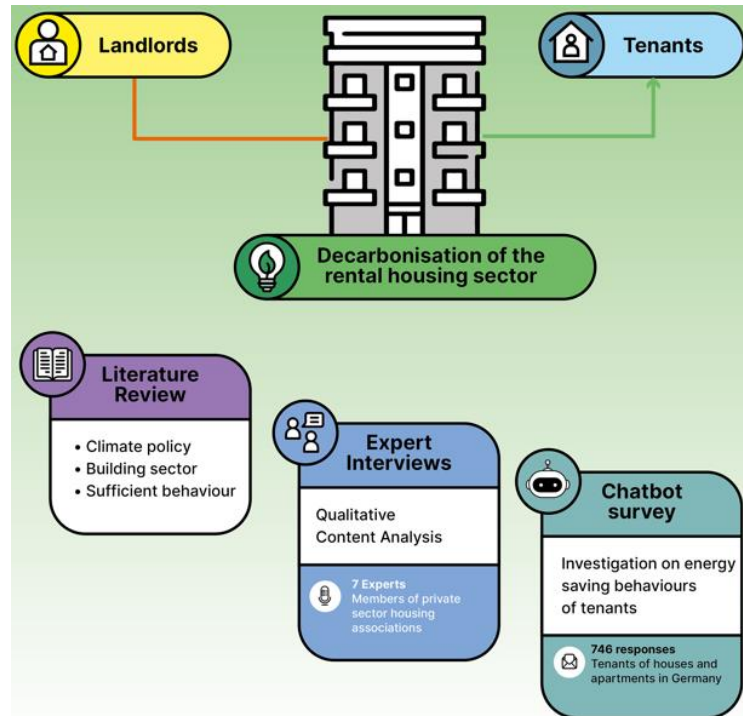
This analysis only looks at private housing companies when considering landlords, given the availability of specialized funding programs and financing options designed for them and their pursuit of profit maximization. Concurrently, they represent the second-largest provider group on the rental housing market in Germany, trailing only private individuals [6].

## 2. Methodology

### 2.1. Research design

The study employs a three-pronged methodology, comprising a literature review, expert interviews, and a chatbot survey, as shown in **Figure 1**. The study uses both qualitative and quantitative methods, with expert interviews investigating landlords' values and practices regarding energy-efficient renovations and chatbots investigating tenants' behaviors. The literature review served as the basis for gathering theoretical knowledge on climate policy, the building sector, and sufficient behavior and linking it to empirical studies. The focus was on global (e.g., *Paris Agreement*), European (*Fit for 55 strategy*), and national (*Climate Protection Act*) requirements, funding programs, and efficiency standards that promote energy-efficient renovation and

sufficient behavior in the building sector. In addition, the literature review analyzed the energy status of the German building stock and the role of tenants in climate protection.



**Figure 1.** Methodological approach and stakeholder overview.

The expert interview was chosen as the primary method for this analysis within the framework of qualitative research, based on Mayring's qualitative content analysis [7]. This method allows for the systematic collection and reconstruction of processes or situations, using a deductive approach to test specific theories and derive insights into the action-oriented skills and practical aspects of respondents who are qualified as experts through their institutional and organizational roles [8]. Through interviews, their perspectives and knowledge on practice-based issues are explored in depth, without being constrained by predetermined structures. The guideline-based interview format allows sufficient room for individual expression while providing a clear structure for the researchers. Finally, the expert interview ensures that the analysis focuses on practical knowledge, thereby minimizing distortions of the research subject [9].

The third method is the utilization of a data collection instrument and sample selection employing a chatbot to investigate the opinions and behaviors of tenants in relation to residential properties. While the expert interviews aim to gain more insights, the chatbot-based quantitative approach aggregates data to analyze tenants' sufficiency behaviors and assess landlords' influence [8]. Chatbots were chosen over traditional questionnaires because of their ability to simulate interactive dialogues, allowing for more detailed and personalized data collection. This method is particularly effective in generating representative insights from a larger tenant population [10].

## **2.2. Data collection**

A key aspect of the expert interviews is the careful and reasoned selection of individuals with relevant expertise [11]. They are usually selected on the basis of their position within organizations, as their professional experience and knowledge are closely related to the research topic. In this case, the focus of the research is on private sector housing organizations and their role in energy refurbishment.

The selection was influenced by several factors, including the accessibility and willingness of the experts to participate. Seven experts from different private sector housing organizations were selected, all with specific knowledge relevant to the research. They were not selected to give individual opinions but as representatives of their respective organizations in order to provide a broader understanding of the issue. Particular emphasis was placed on diversity in the selection to ensure that different aspects were covered. This diversity is essential as housing organizations vary in size, regional focus, and legal structure, all of which influence their approach to energy-efficient refurbishment [12]. The research recognizes that expert interviews are not statistically representative but should ensure an adequate representation of the relevant group in terms of content.

The sample for the study of the chatbot includes tenants of houses and apartments in Germany, excluding commercial rentals. 746 responses were collected, exceeding the representative size of 384 required responses [13].

Quota sampling was used as a deliberate selection method. The sample was systematically designed to be as representative as possible of the population in terms of relevant characteristics such as age, employment status and net income. These characteristics were broken down using recent data on the German population. Tenants were divided into groups in order to ensure a homogeneous structure within the groups and to make the results comparable with the population as a whole.

## **2.3. Data analysis**

Qualitative content analysis was chosen as the method for analyzing the expert interviews because it allows the data to be analyzed systematically and provides reliable results [11]. Compared to other approaches such as free interpretation, coding, or sequence analysis, which were unsuitable for the aims of the thesis, qualitative content analysis proved to be particularly suitable [14]. The core of this method is the category system, which acts as a filter for the interview material and organizes the data into clearly defined categories. Content analysis comprises three central techniques: explication, in which unclear text passages are explained by means of additional material; summarization, in which the material is reduced to its essential content; and structuring, in which the raw material is analyzed according to predefined classification criteria in order to identify relevant cross-sections. The structuring approach was chosen for the study because it allows for a content-focused analysis. The categories were developed deductively from existing theories in order to provide a sound basis for analysis. In the course of the interviews, inductive categories were added as new relevant aspects emerged [7].

The data analysis method is based on the use of a chatbot developed with the Landbot.io tool. The chatbot stores the collected data and enables structured analysis

[15]. The development process involved several steps, including creating a catalogue of questions, defining variables for each question, and designing and publishing the chatbot. The questions and text blocks were crafted to ensure clarity and relevance [16]. The results were then analyzed using the defined variables. The use of the chatbot enabled efficient data collection and the integration of interactive elements, making the survey more engaging.

### **3. Results**

#### **3.1. Tenant insights on sufficiency**

The demographic characteristics of the participants were recorded as part of the analysis to ensure the representativeness of the results. The age groups 21–29 and 30–49 were particularly well represented, while older and very young age groups were underrepresented. This demographic distribution could be important in interpreting patterns of energy-saving and efficiency behavior, as younger generations tend to be more involved in the areas of digitalization and sustainability.

The results of the survey on the implementation of sufficient behavior show that the majority of tenants are already actively implementing energy-saving measures. The survey was completed by 520 respondents out of a total of 746 who participated. In particular, 394 of the 520 respondents (76%) said that they save energy on a regular basis. A key element of energy saving is heating and ventilation behavior. Here, 352 out of 520 (68%) respondents said that they regularly ventilate their homes by opening their windows, which is an efficient way of reducing energy consumption.

However, it was also found that not all of the recommended efficiency measures, such as lowering the flow temperature, were adopted by tenants in practice. This may indicate a lack of information or incentives needed to integrate such measures more widely. Particularly in rented dwellings, where tenants are not directly involved in investment decisions, the integration of energy management systems that respond to user behavior could help to further exploit the potential for efficiency improvements.

Based on these observations, it was found that tenants show a significant interest in reducing their energy use. This indicates that there is a clear potential for further engagement, provided the necessary conditions are in place. However, the findings also revealed limitations posed by building conditions, such as the quality of insulation and window types, which affect the effectiveness of energy-saving measures. In homes with poor insulation or less efficient windows, tenants may face greater challenges in reducing energy consumption, regardless of their behavior.

#### **3.2. Landlord role in supporting tenant sufficiency**

The results of the expert interviews with representatives of housing associations are grouped into three main categories: practical drivers, efficiency drivers and future drivers. In the area of practical influencing factors, it is clear that economic efficiency plays a central role for private housing companies. Energy efficiency measures are mainly implemented if they guarantee financial profitability. At the same time, the willingness to implement such measures is influenced by uncertainties regarding refinancing, especially in the case of government-subsidized tenants.

Experts from private housing companies underline the importance of education when considering the factors that influence tenant behavior. They also emphasize that the active involvement of tenants is crucial, as they have firsthand knowledge of energy-related deficiencies and benefit directly from measures such as window replacement, insulation, or the installation of new heating systems. In addition, targeted communication and training are essential to support tenants in dealing with new technologies and to encourage appropriate behavior in the long term.

Although landlords benefit from subsidy programs, economic considerations often take precedence, resulting in mixed support for tenant-oriented energy-saving measures. As a result, there is a need to give landlords a more structured role in promoting tenant engagement in order to target sufficient behavior.

### **3.3. Policy and structural barriers**

Political and structural barriers hinder the implementation of sufficiency policies and energy efficiency in rented dwellings, according to the results of the expert interviews. At the policy level, the need for energy-intensive goods continues to be emphasized, even though these cause additional emissions and thus hinder an effective sufficiency policy. Another obstacle is the long-term uncertainty in the planning of subsidy programs. Housing companies state that this uncertainty makes it difficult to invest in sufficiency measures and discourages long-term planning.

Structurally, private sector housing companies tend to prioritize economic objectives. As sufficiency measures are often seen as unprofitable, they are often neglected in favor of more profitable alternatives. As a result, sufficiency measures are implemented only to a limited extent, even though they could make a decisive contribution to achieving climate targets.

To support landlord involvement in tenant sufficiency, policymakers could consider implementing stable subsidy programs, tax incentives, and expanded grant coverage to help mitigate financial risks and enhance the appeal of sufficiency measures. Additionally, introducing sufficiency standards and offering technical guidance could help ensure consistent practices and equip landlords with the tools and expertise needed to adopt sustainable approaches.

## **4. Discussion**

The findings of this study elucidate the complex dynamics of implementing sufficiency and energy efficiency measures in the rental housing sector. The following section will address key aspects pertaining to tenants' energy-saving behaviors, the role of landlords, and the structural and policy barriers affecting the broader adoption of sufficiency practices.

### **4.1. Tenant perspectives on energy sufficiency**

The results of the survey indicate a considerable propensity among tenants to embrace energy-saving practices, as evidenced by the prevalence of regular behaviors such as efficient heating and ventilation. Nevertheless, the restricted implementation of more technically complex measures, such as reducing the flow temperature, indicates the existence of potential informational and infrastructural deficiencies. This

finding is consistent with previous literature that has identified building-related factors, such as inadequate insulation or outdated windows, as constraints on the behavioral potential of tenants [17].

The clear interest of tenants in further reducing energy consumption highlights the potential for incorporating tenant feedback into the design and implementation of energy management systems. Such systems have the potential to bridge the gap between tenant behavior and the limitations imposed by building conditions, thereby enhancing overall energy efficiency.

However, the survey design has limitations, which may have affected the representativeness of the findings. The sample was disproportionately composed of younger individuals, who are generally more attuned to sustainability practices. This bias may have resulted in an overestimation of the prevalence of proactive energy-saving behaviors. Furthermore, certain demographic groups, such as retirees, were underrepresented, which may have limited the generalizability of the findings. Additionally, the survey did not fully capture the social impacts of sufficiency measures. Future research should consider measuring the broader, indirect benefits of energy-saving behaviors, such as community-wide engagement or long-term cultural shifts.

#### **4.2. Landlord influence and challenges**

The expert interviews revealed a contrast in how sufficiency measures are perceived and implemented by housing associations. Economic efficiency was identified as the primary determinant of decision-making, frequently superseding considerations of sufficiency.

It is noteworthy that landlords often demonstrate reluctance to engage fully with sufficiency measures, which can be attributed to preconceptions about tenant behavior. Despite tenants' expressed willingness to adopt energy-saving practices, landlords frequently underestimate their efforts, particularly in the context of subsidized housing. This discrepancy could impede collaboration and mutual trust, which are vital for the success of energy sufficiency initiatives. The resolution of these biases may be achieved through the implementation of targeted communication strategies and the co-design of measures.

The role of financial incentives, such as subsidies and tax benefits, is also of great importance. While current programs serve to mitigate financial risks to a certain extent, their long-term planning uncertainties act as a deterrent for landlords who are reluctant to undertake comprehensive energy efficiency projects. As the literature indicates, the implementation of stable and predictable policies is of paramount importance in order to encourage landlord participation in ambitious sufficiency measures.

The interviews revealed a discrepancy between landlords' stated intentions and actual practices, despite the verbal commitment to climate goals. A significant number of landlords expressed concerns about the financial implications of implementing sufficient measures, with a tendency to prioritize short-term economic gains over long-term environmental objectives. This discrepancy suggests that while landlords may recognize the importance of sustainability, their actions frequently fail to align with

these views, which could impede the adoption of energy-efficient measures. Furthermore, this disconnection may also be compounded by assumptions about tenants' willingness to engage in such practices.

Landlords also exert considerable influence over the design of financial incentives and subsidy programs, yet this aspect was not addressed in the expert interviews. While landlords emphasized the necessity for reliable financial support, their role in shaping subsidy structures and policy recommendations remains a crucial area for further investigation. The absence of such involvement in the discussions may contribute to a discrepancy between landlords' needs and the available incentives, thereby limiting the success of energy-efficiency initiatives.

The landlord-tenant dynamic in subsidized housing can present challenges to the implementation of sufficiency measures. Landlords may be reluctant to invest in energy efficiency due to fixed rental incomes, while tenants, despite having limited control, often express a strong desire to participate in energy-saving efforts. This presents an opportunity for landlords to engage tenants in co-creating strategies that align with sustainability goals. Effective communication and educational programs can empower tenants and enhance collaboration, leading to better adoption of sufficiency practices.

### **4.3. Structural and policy barriers**

The study identified two principal structural barriers: the presence of outdated building stock and a shortage of technical expertise. The unpredictability of building conditions, such as the potential for unforeseen structural weaknesses, can lead to increased costs and a deterrent effect on landlords' willingness to implement energy-efficient renovations. This is consistent with prior findings that recommend investment in advanced diagnostic technologies as a means of mitigating these risks.

Furthermore, policy-related barriers, particularly the absence of mandatory sufficiency standards, serve to exacerbate the issue. Although landlords recognize the significance of achieving climate targets, economic factors frequently result in only minimal compliance, rather than proactive engagement. The establishment of transparent, enforceable standards in conjunction with financial incentives could facilitate a shift in this trend, as previously proposed by studies in this field [18].

The findings indicate the potential efficacy of collaborative frameworks between policymakers, landlords, and tenants. By explicitly defining the respective responsibilities and providing technical and financial support, such frameworks could address the current fragmentation of accountability, which currently hampers the adoption of sufficiency measures.

A further challenge in interpreting the findings is the difficulty in aligning the results from the tenant surveys and expert interviews. Although tenants demonstrated a considerable enthusiasm for energy-saving practices, experts highlighted that structural and technical constraints were frequently more substantial obstacles. This discrepancy illustrates the mismatch between tenants' aspirational energy-saving intentions and the practical limitations imposed by their living environments. Additionally, discrepancies between survey respondents' self-reported behaviors and

expert assessments emphasize the complexity of translating intentions into actionable measures.

Policymakers play a significant role in influencing the development of energy sufficiency through the formulation and implementation of subsidy programs and sufficiency standards. By designing transparent and flexible policies that align with the needs of both landlords and tenants, policymakers can facilitate the adoption of comprehensive energy-saving measures. It is crucial for policymakers to play an active role in establishing clear sufficiency standards, not only to set minimum requirements but also to drive innovation and higher standards within the rental housing sector. Moreover, policymakers can optimize the impact of subsidy programs by guaranteeing their longevity and reliability, thus providing landlords with the financial assurance necessary to invest in long-term energy efficiency projects. This strategy would address current policy-related constraints by aligning the economic objectives of landlords with the broader environmental objectives required to meet climate targets. Through these strategic interventions, policymakers can foster a synergistic relationship between regulatory frameworks and market-driven initiatives, ultimately leading to a more sustainable and resilient housing sector.

## 5. Conclusion

In conclusion, this study emphasizes the pivotal role played by private housing companies in enabling tenants to adopt energy-sufficient practices within the rental housing sector in Germany. As has been demonstrated, while tenants evince a strong willingness to engage in sustainable behaviors, the realization of these intentions requires structural support and guidance, particularly in the form of energy-efficient renovations and clear communication about practical energy-saving measures. The renovation strategies of private housing companies have the potential to exert a significant influence on tenant sufficiency. However, the pursuit of these strategies is frequently constrained by economic considerations, particularly in the context of rising costs that have prompted a re-evaluation of renovation goals for 2023.

The findings emphasize that the promotion of energy sufficiency in the housing sector is a responsibility that must be shared. It is imperative that private landlords are not left to bear this burden alone; rather, policy support and funding programs are essential to bridge financial gaps, enabling both landlords and tenants to contribute meaningfully toward Germany's climate targets. In the absence of consistent support from policymakers, banks, and investors, the sector is at risk of falling further behind on renovation goals, which would impede progress towards the *Paris Agreement* objectives.

In consideration of the future, it is evident that integrating sufficiency into the initial design of new constructions and involving tenants in renovation planning can assist in anticipating challenges and fostering support for sustainability measures. By fostering collaboration between housing companies, tenants, and policymakers, the rental housing sector can more effectively balance sufficiency and efficiency goals, creating a pathway that aligns both tenant behavior and landlord capabilities with Germany's overarching climate commitments.

This study shows how private housing companies can help make homes more energy-efficient, which is key to growth in Germany's energy sector. Private landlords encourage energy-efficient practices among tenants, driving demand for sophisticated energy storage and conversion solutions. These systems, including efficient heating and residential battery storage, optimize in-home energy usage, reducing the demand on the broader energy grid and supporting Germany's climate targets.

Integrating sufficiency principles in rental housing offers the energy sector a chance to develop storage systems for multi-tenant environments. Such systems would enable landlords to manage energy more sustainably while offering tenants benefits in terms of reduced costs and control. By aligning energy solutions with rental housing needs, the sector can support a low-carbon future for Germany's building industry.

**Author contributions:** Conceptualization, LB and EMG; formal analysis, LB; original draft preparation, LB and EMG; writing, LB and EMG; editing, VV and UB; supervision, UB; project administration, EG; funding acquisition, VV and EMG. All authors have read and agreed to the published version of the manuscript.

**Funding:** This paper is based on a master's thesis, which was written with the support of the team responsible for the MEnegie project. The project MEnegie is funded by the German Federal Ministry for Economic Affairs and Climate Action (BMWK).

**Acknowledgments:** The authors thank their consortium colleagues, students and participants for their important contributions and discussions.

**Institutional review board statement:** Not applicable.

**Informed consent statement:** Informed consent was obtained from all subjects involved in the study.

**Conflict of interest:** The authors declare no conflict of interest.

## References

1. IRENA. Renewable energy and climate pledges: Five years after the Paris Agreement. Available online: <https://www.irena.org/publications/2020/Dec/Renewable-energy-and-climate-pledges> (accessed on 2 November 2024).
2. Kola-Bezka M, Leki K. Household energy behaviour in the times of crisis: Lessons for policy initiatives from peripheral, fossil-dependent regions of the European Union. *Energy Policy*. 2024; 188: 114113. doi: 10.1016/j.enpol.2024.114113
3. United Nations Climate Change. Energy Is at the Heart of Global Goals and Paris Agreement|UNFCCC. Available online: <https://unfccc.int/news/energy-is-at-the-heart-of-global-goals-and-paris-agreement> (accessed on 2 November 2024).
4. Salvia G. Sustainability designed with(out) people? Understanding for what energy is (over-)used by tenants in an energy efficient public housing in milan. Available online: <https://api.semanticscholar.org/CorpusID:254046019> (accessed on 2 November 2024).
5. Gillingham K, Harding M, Rapson D. Split Incentives in Residential Energy Consumption. *The Energy Journal*. 2012; 33(2): 37-62. doi: 10.5547/01956574.33.2.3
6. Fahrenholz V, Korger S, Krischik A, Rotermund M. Sustainable Finance – Die EU-Taxonomie. Available online: [https://static1.squarespace.com/static/54f9ea6be4b0251d5319ad8b/t/628df80d118235250b30a686/1653471250823/SF\\_EU-Taxonomie+-+finales+Lay-out.pdf](https://static1.squarespace.com/static/54f9ea6be4b0251d5319ad8b/t/628df80d118235250b30a686/1653471250823/SF_EU-Taxonomie+-+finales+Lay-out.pdf) (accessed on 2 November 2024).
7. Flick U. *An Introduction to Qualitative Research*, 6th ed. Thousand Oaks, CA: SAGE Publications; 2018.
8. Bryman A. *Social Research Methods*, 5th ed. Oxford: Oxford University Press; 2015.
9. Flick U, von Kardorff E, Steinke I. *Qualitative research: a handbook (Geman)*. Rowohlt Taschenbuch; 2022.

10. Verhoeven T. Digitalisation in recruiting: How artificial intelligence, algorithms and bots are changing recruiting (German). Wiesbaden: Springer Fachmedien Wiesbaden; 2020.
11. Bogner A, Littig B, Menz W, et al. Interviewing Experts. Palgrave Macmillan UK; 2009. doi: 10.1057/9780230244276
12. Kvale S, Brinkmann S. *InterViews: Learning the Craft of Qualitative Research Interviewing*, 3rd ed. Thousand Oaks, CA: SAGE Publications; 2015.
13. Hinz A, Schumacher J, Albani C, et al. Population-representative standardization of the scale for general self-efficacy expectations (German). *Diagnostica*. 2006; 52(1): 26-32. doi: 10.1026/0012-1924.52.1.26
14. Krell C, Lamnek S. *Qualitative Sozialforschung: Mit Online-Material, Originalausgabe*. Weinheim: Julius Beltz GmbH & Co. KG; 2024.
15. Følstad A, Araujo T, Papadopoulos S, et al., eds. *Chatbot Research and Design*. Springer International Publishing; 2021. doi: 10.1007/978-3-030-68288-0
16. Stäcker O, Stanoevska-Slabeva K. Quo vadis Chatbots? *Wirtschaftsinformatik & Management*. 2018; 10(6): 38-46. doi: 10.1007/s35764-018-0122-x
17. Amodu T. Regulating the private rented sector: millennial themes. *Journal of Property, Planning and Environmental Law*. 2018; 10(2): 154-168. doi: 10.1108/jppel-03-2018-0010
18. BMWK-Federal Ministry for Economic Affairs and Climate Action. Federal Ministry for Economic Affairs and Climate Action sets new incentives for refurbishments and introduces a bonus for serial refurbishments. Available online: <https://www.bmwk.de/Redaktion/EN/Pressemitteilungen/2022/12/20221209-federal-ministry-for-economic-affairs-and-climate-action-sets-new-incentives-for-refurbishments.html> (accessed on 2 November 2024).