

*Steven März*

# Beyond economics

Understanding the decision-making of  
German small private landlords in terms of  
energy efficiency investment

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# 1 INTRODUCTION

2 Mankind faces many social and ecological challenges in the 21<sup>st</sup> century. From an ecological perspective,  
3 Rockström et al. (2009) show that the ecosystem's limits have already been exceeded in some dimensions (such  
4 as climate change). This assessment is underpinned by the latest IPCC report, which makes it clear that a  
5 significant effort will have to be made by the international community to maintain global warming below the  
6 2°C threshold. Global GHG emissions need to be reduced by between 40% and 70% by 2050, compared to 2010  
7 levels (Pachauri and Mayer 2015, p. 21). Against this background, the current ratification of the Paris Agreement  
8 is a crucial first step towards successfully constraining global warming on a worldwide scale (Obergassel et al.  
9 2015). The German WBGU<sup>1</sup> differentiates this global emissions path for different regions and countries, taking  
10 into account their historical emissions and their development pathways, and underlines the requirement for  
11 industrialised countries such as Germany to immediately reduce their GHG emissions (WBGU 2009).

12 The German government committed to ambitious climate protection targets in 2010 to decrease its emission  
13 levels by up to 95% by 2050 compared to 1990 levels, known as the 'German Energiewende' (BMW and BMU  
14 2010). To achieve this target, a Climate Action Plan that describes transition pathways, guiding principles and  
15 policies was developed in 2016 (BMUB 2016). Building stock is one of the crucial sectors for tackling climate  
16 change, as it is responsible for 35% of Germany's total final energy consumption and one-third of the country's  
17 GHG emissions (BMW 2015, p. 5). The goal is to achieve "virtually climate-neutral" building stock by 2050.  
18 For this purpose, an "Energy Efficiency Strategy for Buildings" was introduced in 2015, building on the long-  
19 established policy of fostering energy efficiency investment. Although these comprehensive policy packages are  
20 considered internationally as exemplary (Lowe 2009; Rosenow 2012), in the building sector this aspiration and  
21 the reality increasingly differ. Primary energy demand falls short compared to set targets and the rate of energy  
22 renovations remains at 0.8% to 1.0% – an inadequate level for achieving the required emissions reduction  
23 (Diefenbach et al. 2010).

24 To foster energy efficiency investment, comprehensive knowledge of the decision-making processes of all the  
25 different housing owner groups is required. This is a particular challenge in Germany, where 80% of all  
26 dwellings are privately owned. While German homeowners (owner-occupiers) have been widely researched  
27 (Friege 2016; Friege et al. 2016; Stieß and Dunkelberg 2013), there is a lack of knowledge about small private  
28 landlords (SPL)<sup>2</sup> (Cischinsky et al. 2015, p. 28). In particular, in terms of energy efficiency investment, there is  
29 very little research compiled internationally (Ambrose 2015; Eadson et al. 2013; Hope and Booth 2014) or  
30 nationally (BBSR 2014; Renz and Hacke 2016). SPL, therefore, follow black box decision-making processes,  
31 which makes it hard to assess how suitable the existing policy framework is.

32 This situation is further complicated due to the fact there is little available data about the energy efficiency  
33 performance of different owner groups. However, international studies demonstrate that the energy efficiency  
34 performance of private rented houses is lower than that of other owner groups (Ambrose 2015; Hope and Booth  
35 2014). The so-called "split-incentive" is often cited as an explanation for the reluctance of SPL to renovate (Bird  
36 and Hernández 2012; Kenneth Gillingham 2012; Neitzel 2011). This refers to the situation when the person  
37 paying for the investment (in this case the landlord) is not the same person who benefits from it (in this case the  
38 tenant). According to this neoclassical argument, solving this principal-agent problem would lead directly to  
39 higher levels of investment in energy efficiency. In Germany, several policies are in place to overcome this  
40 dilemma, but renovations to improve energy performance still fall short.

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<sup>1</sup> The German Advisory Council on Global Change (WBGU) is an independent, scientific advisory body set up in 1992 by the German federal government. The council analyses global environment and development problems, reports on these and provides recommendations for actions and further research.

<sup>2</sup> In Germany, there is no official definition of the term small private landlords (SPL). In this paper we follow the definition of Cischinsky et al. (2015, p. 29), who define SPL as natural persons (in a legal sense) who, individually, as a couple, or as part of a community of heirs possess apartments or houses and rent them out. SPL need to be distinguished from other professional owner types in the private rented sector, such as housing associations or companies.

41 The purpose of this paper is twofold. Based on qualitative research, the author aims to shed light on the black  
42 box of SPL decision-making processes, with a special focus on low demand housing markets. The hypothesis is  
43 to understand the reluctance of SPL to renovate; explanations that go beyond economics are required. Secondly,  
44 the author analyses the existing German policy framework to understand its suitability in terms of addressing the  
45 specific needs of SPL. Both aspects contribute to policy recommendations for substantially boosting the energy  
46 efficiency investments made by SPL.

## 47 ‘GERMAN ENERGIEWENDE’ – POLITICAL TARGETS AND 48 POLICIES

49 Germany aims to reduce the primary energy demand of its building stock by 80% by the year 2050, compared to  
50 2008 levels (BMW<sub>i</sub> and BMU 2010). To achieve this target a combination of energy savings and the use of  
51 renewable energies is required<sup>3</sup>. A comprehensive policy framework of “sticks and carrots” is in place, which is  
52 often praised by the international community (De T’Serclaes 2007; Lowe 2009; Rosenow 2012). Four main  
53 types of instruments exist to foster energy efficiency investments in residential buildings: regulation, incentives,  
54 information and advice, and research and demonstration.

55 Mandatory minimum energy efficiency standards were first introduced in the Thermal Retention Regulations  
56 (Wärmeschutzverordnung (WSVO)) in 1977 and were subsequently tightened several times. The regulations  
57 applied to new buildings and led to a reduction in heating energy demand from an average of 270 kWh/m<sup>2</sup> per  
58 year in 1977 to the current value of less than 50 kWh/m<sup>2</sup> per year (Galvin 2014; Schüring 2014). In 2002, the  
59 WSVO was replaced by the EnEV (Energieeinsparverordnung) based on the Energy Saving Act (EnEG). The  
60 aim is to further tighten energy performance standards in order to transpose the EU’s Energy Performance of  
61 Buildings Directive (EPBD) into German law. According to this directive, all new construction must be almost  
62 zero-energy by 2021. As 64% of all residential buildings were built before the first WSVO, addressing the  
63 energy efficiency of existing buildings is crucial. Therefore, since 2002 the EnEV requires energy renovations to  
64 meet the existing mandatory minimum thermal standards for the renovation of existing homes if more than 10%  
65 of any building component (e.g. roof, windows, wall etc.) is repaired or replaced. Only in cases of  
66 comprehensive energy renovations is the energy demand allowed to be as much as 40% above the new build  
67 standard, because the physical restrictions of existing buildings can make it impossible to meet the new building  
68 standards in an economically viable way. EnEV also stipulates mandatory retrofitting of top floor ceiling or  
69 rooftop insulation, insulation of warm pipes and the renewal of old and inefficient boilers (EnEV 2014 § 10/1-3).  
70 It also enforces its rules with fines of up to 50,000 Euro. EnEV regulations are applicable to homeowners and  
71 landlords, with some exceptions for small buildings.

72 Three main policies incentivise energy efficiency investment. Firstly, the ‘CO<sub>2</sub> Rehabilitation Programme’  
73 provides subsidised loans and grants for comprehensive renovations to improve energy performance to achieve  
74 ‘KfW Efficiency House’ standard, as well as individual energy efficiency measures in existing buildings  
75 (Rosenow and Galvin 2013). Funds depend on the building’s energy efficiency performance after the renovation;  
76 for example, at the time of writing, refurbishment meeting KfW Efficiency House standard 55<sup>4</sup> may attract a  
77 grant to cover 30% of the cost, while for single measures grants of up to only 10% are available. However,  
78 grants are only available for owner-occupied homes and communities of owners. SPL who rent out apartment  
79 buildings can only apply for subsidised loans. These include redemption grants, but the conditions are worse  
80 than for grant funding. In 2016, the government introduced an ‘Energy Efficiency Market Incentive  
81 Programme’, which supports the installation of ventilation systems in conjunction with measures for the building  
82 envelope to avoid mould etc. and the replacement of inefficient heating systems (BMW<sub>i</sub> 2015). The second

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<sup>3</sup> With respect to the aim of this paper, the author focuses on policies to promote energy saving. For a broader perspective, see Germany’s Energy Efficiency Strategy (BMW<sub>i</sub> 2015).

<sup>4</sup> A ‘KfW Energy Efficiency House 55’ only consumes 55% of the primary energy a new building can consume according to the EnEV. Thus, the primary energy consumption is 45% lower than the minimum energy performance standard.

83 incentive refers to the tax system. In terms of tax, landlords have an advantage over homeowners as labour and  
84 material costs for energy efficiency renovations are, to some extent, tax-deductible<sup>5</sup>. Energy efficiency  
85 investments are mostly considered as maintenance costs and, therefore, reduce the landlord's tax bill. The  
86 German Civil Code (BGB) provides a third incentive. To boost energy-saving modernisations, landlords are  
87 permitted to pass 11% of the energy-saving related costs to tenants (§ 559 BGB), making it possible to recoup  
88 the cost of energy renovations in less than 10 years through the legal increase in net rents.

89 The German Federal government also provides information to raise awareness about energy efficiency.  
90 Homeowners and landlords receive grants for on-site energy consultations. Consumer advice centres and, in  
91 some cases, city or local authority utility companies also provide energy advice. To assess the energy efficiency  
92 performance of residential buildings, landlords are obliged to provide an energy certificate to tenants. The  
93 government also ran several advertising campaigns to support energy efficiency investment, such as 'Dämmen  
94 lohnt sich' ('Insulation is Worthwhile'). Finally, the 'energy in buildings and neighbourhoods' research network  
95 brings together initiatives to support energy transition research in the building sector.

96 The analysis shows that the existing policy framework follows a neoclassical explanatory model. The EnEV  
97 defines thermal measures that are "economically viable" and, therefore, reasonable ("wirtschaftlich vertretbar").  
98 Comprehensive renovations to improve energy performance or single measures that go beyond state-of-the-art  
99 technologies are eligible for funding, which is supposed to balance the extra energy efficiency costs to ensure  
100 economic viability. In particular, § 559 BGB was implemented to provide short and predictable payback periods.  
101 Finally, information and consulting tools and policies deliver the message that energy renovation makes  
102 economic sense and owners generate revenue via decreased energy costs, enhanced real estate values and  
103 increased rents etc. (Galvin 2014). This national policy framework does not differentiate between different  
104 housing markets or building characteristics, although demand for housing naturally affects if and to what extent  
105 extra costs can be passed to tenants and building specifications influence renovation costs (Färber 2013). The  
106 framework also fails to take into consideration the specific needs of different owner groups. While there are  
107 demarcations between owner-occupied and rental property, the heterogeneity of actors within the rental market  
108 is not reflected. Small private landlords are generally treated the same as large housing companies, although little  
109 is known about their decision-making processes.

## 110 SMALL PRIVATE LANDLORDS: SLEEPING GIANTS OF THE 111 'GERMAN ENERGIEWENDE'?

112 Germany has a very heterogeneous ownership structure, with 80% of all dwellings privately owned and the  
113 remaining 20% held by institutional providers such as municipal or private housing companies or housing  
114 associations. As a result, local and national authorities have very little direct influence on the energy efficiency  
115 performance of the residential building stock. In addition, Germany has one of the lowest ownership rates in  
116 Europe, meaning that the share of rented dwellings is one of the highest in the world (Kemp and Kofner 2010;  
117 Scanlan and Kochan 2011). According to the latest census data from 2011, 43% of all German residential  
118 dwellings are owner-occupied and 57% are rented. Within the private rented sector, small private landlords  
119 (SPL)<sup>6</sup> dominate the housing market and are responsible for 65% of all apartments on the rental market and 37%  
120 of the total housing market. This is one of the highest levels of SPL in the world, so understanding the decision-  
121 making processes of SPL is crucial for harnessing energy efficiency potential.

122 While there is in-depth knowledge about homeowners and their investment in energy efficiency in Germany and  
123 elsewhere (Bartiaux et al. 2014; Friege 2016; Friege and Chappin 2014; Gram-Hanssen 2014; Stieß and  
124 Dunkelberg 2013), little is known about small private landlords (SPL). Scanlan and Kochan (2011) compare

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<sup>5</sup> For homeowners labour costs only of up to €1,200 are tax-deductible according to the Income Tax Act (EStG)

<sup>6</sup> This paper focuses on SPL who individually own complete buildings. Communities of owners ('Wohneigentumsgemeinschaften', WEG) are not part of the empirical work, although the number of communities of owners is growing.

125 several rental markets and provide an overview, including the regulations and incentive programmes. In the UK,  
126 the Private Landlord Survey provides insights into the general characteristics and investment strategies of the  
127 private rented sector (including housing companies). However, Hope and Booth (2014) conclude that “there is a  
128 lack of current information on the attitudes and behaviours of private sector landlords with respect to improving  
129 the energy efficiency of their tenanted homes” in the UK (Hope and Booth 2014, p. 372). There is a similar lack  
130 of information for other parts of the world because very little research exists that can provide deep insights into  
131 decision-making processes with regard to energy efficiency (Ambrose 2015; Eadson et al. 2013; Gabriel et al.  
132 2010; Hope and Booth 2014; Wilkinson and Goodacre 2002). Ambrose (2015, p. 4) also criticised the fact that  
133 existing knowledge is mainly based on quantitative surveys, but there is a “strong indication that not enough is  
134 known about what deters landlords from taking what policymakers believe is rational action”. Such information  
135 can only be discovered using qualitative research.

136 In Germany, the knowledge about SPL is no better, despite the high share of SPL in the housing rental market.  
137 Some research exists that explores the role of SPL (and property owners in general) in urban development and  
138 planning processes (Broszio 2012; Krüger et al. 2010; Vollmer 2015). Other research offers a general overview  
139 of investment and management strategies and characteristics of SPL (Cischinsky et al. 2015; Goderbauer 2007;  
140 Schätzl et al. 2007). Volkerding (2003) examines the role of SPL in the former GDR after reunification. In  
141 recent years, the owner’s association ‘Haus&Grund’, an organisation which has long focused on legal advice for  
142 its members (mainly homeowners and SPL), started to engage in urban development projects (Metzmacher  
143 2015) and also begun to compile surveys among their members who rented out properties (Haus&Grund 2015).  
144 Finally, a few research projects have tried to identify barriers and motives for energy efficiency investment  
145 (Gossen and Nischan 2014; Renz and Hacke 2016).

146 In Germany, there is no official and reliable database to assess the energy efficiency performance of the building  
147 stock with respect to different owner groups<sup>7</sup>. Therefore, it is complicated to compare the building stock of SPL  
148 with owner-occupied homes or homes let by institutional providers. However, we know from international  
149 studies that the energy efficiency performance of the private rented sector is poorer than that of any other  
150 sector/owner group (Barton 2012). In England, the number of F and G rated properties fell in the private rented  
151 sector at a slower rate than in any other group of owners between 1996 and 2012, and in the private rented sector  
152 the share of F and G rated buildings is the highest (DECC 2015, p. 7). This is not only a challenge in terms of  
153 climate change and energy transition, but also presents issues in the social context. In England, one-third of all  
154 fuel poor households live in private rented homes, while this sector only accounts for 17% of all households  
155 (DECC 2015, p. 10). Despite the lack of official data, there are strong indications that the energy efficiency  
156 performance of SPL homes is falling short compared to political targets and property let by other owner groups.  
157 According to the latest evaluation of the German ‘CO<sub>2</sub> Building Rehabilitation Programme’, 84% of all funding  
158 applications came from owner-occupied homes (Diefenbach et al. 2015, p. 60) and a survey commissioned by  
159 the DDIV (Dachverband Deutscher Immobilienverwalter, Association of Property Managers) showed that  
160 communities of owners (WEG) assessed the energy performance of their properties and found they were  
161 significantly poorer than any other owner group (DDIV 2014, p. 15). Moreover, the ‘Wärmemonitor’ evaluates  
162 the energy consumption of multi-family dwellings and confirms findings from Diefenbach et al. (2010), namely  
163 that SPL invest less in their properties. They also make fewer energy efficiency improvements in the course of  
164 renovations than housing companies do (Michelsen 2016; Michelsen et al. 2015).

165 To conclude, there is no in-depth understanding in Germany of the decision-making processes of SPL, nor does  
166 the policy framework reflect the heterogeneity of the German housing market. The neoclassical-driven policy  
167 design primarily focuses on the split-incentive as the main barrier to energy efficiency investment. However, this  
168 narrow perspective of investment decisions seems to be inadequate, in particular with respect to the low rate of  
169 energy renovations in Germany. This points to the need to understand not only market barriers, but also non-

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<sup>7</sup> Diefenbach et al. (2010) compare single-family and multi-family houses, yet do not distinguish between owners. Michelsen (2016) analyses probably the largest data set for German multi-family homes based on data from an energy billing service provider. However, the dataset only contains material from one provider and does not include gas floor heating facilities. Moreover, only energy consumption, not demand, is measured.

170 market barriers, in order to harness the energy efficiency potential in SPL buildings. To achieve this, a broader  
171 perspective of explanatory models is necessary to understand decision-making from different research  
172 disciplines beyond neoclassical economics.

## 173 **DECISION-MAKING MODELS – A LITERATURE REVIEW**

174 Decision-making is a complex process where alternatives are weighed up against each other based on objective  
175 information, subjective assessments or social norms. Decision-making processes also differ in terms of speed,  
176 effort or cognition. Some decisions are made intuitively, while others are conscious. The different aspects of  
177 decision-making need to be considered to better understand investments made by SPL. Therefore, a review of  
178 the existing models of individual decision-making from different research disciplines is presented. The aim is  
179 twofold. Firstly, the models may help to identify determinants that deter SPL from making energy efficiency  
180 investments. Secondly, the overview provides a framework for empirical research as it helps to classify and  
181 structure the findings. Both aspects may contribute to the development of a greater number of tailor-made  
182 policies aimed at SPL (Wilson and Dowlatabadi 2007). Decision-making models from economic theory,  
183 innovation theory, social/environmental psychology and sociology are discussed in the following section.

## 184 **DECISION-MAKING MODELS IN DIFFERENT RESEARCH DISCIPLINES**

### 185 *NEOCLASSICAL THEORY AND BEHAVIOURAL ECONOMICS*

186 Neoclassical economics describes decision-making as a cost-benefit analysis. An energy efficiency investment  
187 made by a SPL takes place if the expected benefit (e.g. increased rent, higher real estate value, better letting  
188 prospects etc.) exceeds the costs (capital costs and opportunity costs). To assess the cost-benefit ratio in  
189 microeconomic theory, assumptions are made based on rational choice theory (Coleman and Fararo 1992; Goode  
190 1997). Individuals seek to maximise their utility, given their budget constraints. They act out of self-interest and  
191 take decisions based on comprehensive and relevant information. Their preferences are ordered, known,  
192 invariant and consistent. Finally, every decision is rational and unaffected by emotions or the perception of one's  
193 decision by personal or social networks (Henry 2011).

194 However, growing empirical evidence shows that individuals are not always rational decision-makers  
195 (Kahneman 2003). If they were, economically viable energy efficiency potential would already have been fully  
196 exploited. Jaffe and Stavins (1994) refer to this phenomenon as the so-called “energy efficiency gap”. The  
197 reasons for this gap include market imperfections (external effects, incomplete information, lack of access to  
198 capital etc.), which can be explained by neoclassical theory, as well as non-market related factors (such as  
199 cognitive bias and behavioural anomalies). In particular, in situations that are highly complex, offer a variety of  
200 choice and results may be risky or uncertain, individuals tend to use “rules-of-thumb”, “heuristics” and mental  
201 “shortcuts” instead of relying on rational considerations (Gigerenzer and Gaissmaier 2011; Kahneman et al.  
202 1991; Tversky and Kahneman 1974). This recognition is the basis for behavioural economics, which seeks to  
203 integrate the psychological understanding of decision-making into microeconomic theory to improve its validity  
204 (Beck 2014, p. 9).

### 205 *INNOVATION AND DIFFUSION THEORY*

206 The innovation and diffusion theories seek to understand how and why innovation spreads throughout markets,  
207 society and individuals. An innovation can be an idea, a practice or a technology perceived as being ‘new’  
208 (Rogers 2004). Its diffusion is described as “the process in which an innovation is communicated through certain  
209 channels over time among the members of a social system” (Rogers 2003, p. 5). Within this definition, energy  
210 efficiency technologies are seen as innovations. Whether they diffuse or not depends on their attributes, the  
211 attitude of individuals towards the technologies and the social communication processes. Rogers (2003)  
212 identifies five attributes of an innovation that explain adoption rates. High adoption rates are expected if the  
213 technology provides a relative advantage over incumbent technologies; is compatible with existing needs, social  
214 norms and behaviour; is not too complex; can be tested; and is visible to others. This list helps to explain the  
215 barriers to the adoption of energy efficiency technologies, in particular for SPL. Most technologies are not  
216 visible to others (e.g. roof/ceiling insulation, triple glazing etc.); a wide variety of insulation materials are used

217 for different techniques (e.g. exterior/internal/core insulation), which makes finding the best solutions time  
218 consuming and complicated; energy efficiency technologies may require the adaptation of the physical  
219 properties of buildings (e.g. to avoid thermal bridges); good-practice examples mostly only exist for new  
220 buildings; and the relative advantage in terms of higher rental values depends on the local housing market.

221 Decision-making is seen as a social process that takes place in five stages, from knowledge to behavioural  
222 change and confirmation. Within these stages, the technology's attributes and the adopter's characteristics are  
223 crucial as they form the attitude to the technology. Rogers (2003) distinguishes between five groups, ranging  
224 from risk-seeking pioneers to risk-averse traditionalists.

225 While Rogers (2003) asks "how" and "why" innovation diffuses, in geographical science Hägerstrand (1967)  
226 analyses "where" innovation spreads and seeks spatial patterns of the diffusion of innovations.

## 227 *SOCIAL AND ENVIRONMENTAL PSYCHOLOGY*

228 Since the 1970s, social and environmental psychology has focused on environmental and energy-related  
229 behaviour and decision-making (Bamberg and Möser 2007; Hines et al. 1987). Psychological studies  
230 demonstrate that similar information and (financial) incentives are perceived differently by different social  
231 groups (P. Stern et al. 1986) and show the shortcomings of the assumptions made by neoclassical theory about  
232 rational actions. In social psychology, a pro-environmental decision, such as an energy efficiency investment, is  
233 seen as a conscious decision to avoid or limit negative environmental impact relative to comparable behaviours  
234 or decisions (Wilson and Dowlatabadi 2007). According to this understanding, SPL invest in energy efficiency  
235 because they strive to reduce the energy demand of their properties in order to tackle climate change, enhance air  
236 quality, avoid negative environmental consequences for themselves and future generations etc. The challenge is  
237 to understand how environmental awareness turns into pro-environmental behaviour. Several studies have tried  
238 to link pro-environmental behaviour with the socio-demographic characteristics of the decision-maker, but were  
239 unable to identify clear and consistent correlations (Wilson and Dowlatabadi 2007). For this reason, research  
240 puts emphasis on attitudes, values and beliefs as explanatory constructs. In addition to the Theory of Planned  
241 Behaviour (TPB) (Ajzen 1991), the Value-Belief-Norm (VBN)<sup>8</sup> developed by Stern and colleagues (P. Stern et  
242 al. 1999) has been used in various environmental studies to understand decision-making (Fornara et al. 2016;  
243 Kiatkawsin and Han 2017; Lind et al. 2015; López-Mosquera and Sánchez 2012; van der Werff and Steg 2016).

## 244 *SOCIOLOGY*

245 So far, the theories discussed explain decision-making as an individual process. However, sociologists argue that  
246 every decision is embedded in the socio-technical regime in which it is made. Individual needs, attitudes, values  
247 and beliefs do not emerge autonomously but are the result of social debates and perceptions. According to  
248 Wilson and Dowlatabadi (2007), the following four main aspects are relevant for understanding decision-making  
249 from a sociological perspective: embeddedness, constraints in choice, counter-marketing and impetus. With  
250 respect to energy efficiency investments made by SPL, embeddedness means that the attitude of family, friends,  
251 neighbours, tenants or even the wider society towards energy efficiency investment affect the SPL's own  
252 assessment. The more negative the SPL's personal or social networks are, the less worth the SPL will assign to  
253 energy efficiency investment. Constraints in choice result in the fact that even if a SPL has a strong belief in  
254 energy efficiency investment, this will not necessarily lead to an investment. The lack of qualified tradesmen,  
255 gaps in infrastructure (e.g. no district heating system) or the physical constraints of the building may hamper an  
256 investment. The third aspect shows how the media and public debate frame energy efficiency. Recently, the  
257 German public debate about energy efficiency has turned negative (Becker et al. 2014; Hanf 2013; Weber 2016).  
258 Finally, every decision requires an impetus. This impetus could be building damage, queries from tenants or

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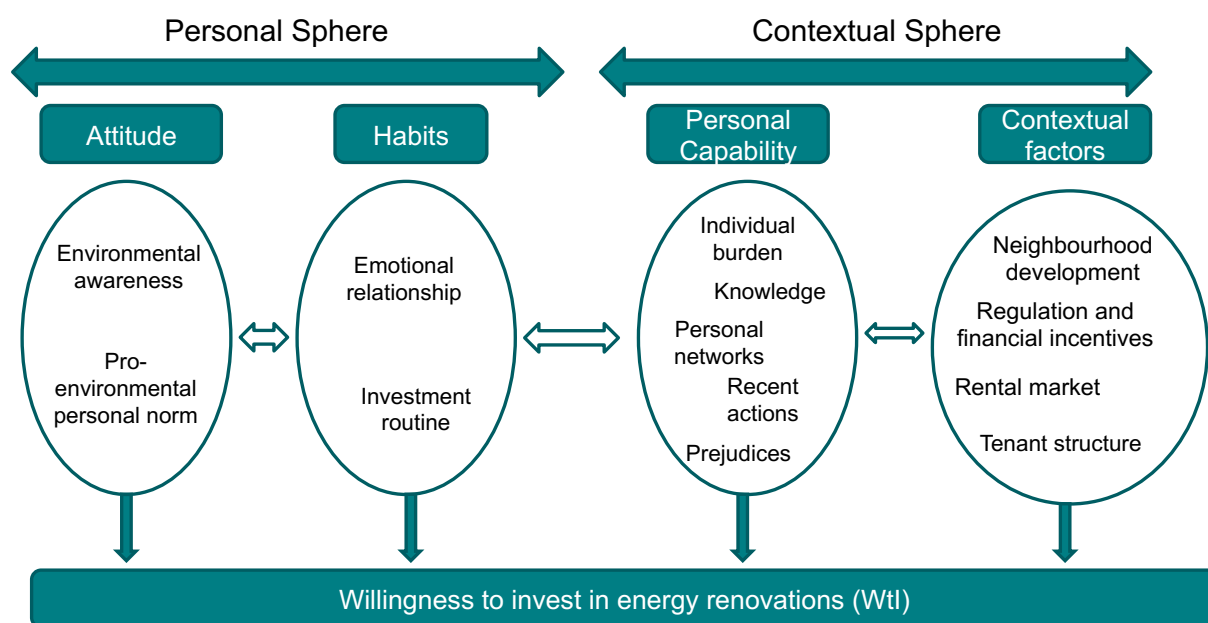
<sup>8</sup> The theory combines the three other theories: *Universal Theory of Human Values* (Schwartz and Bilsky 1987), *Normative Influence Model* (Schwartz 1977) and *New Environmental Paradigm* (Dunlap et al. 2000). It assumes a hierarchical model where individual value orientation directly influences beliefs in specific environmental issues, and thereby influences attitudes and behaviour. The theory starts with relative stable value orientation presenting an individual's personality, which affects more specific beliefs about human-environment relationships (NEP) and an individual's beliefs about the consequences of their own actions and the individual's responsibility and ability to avoid negative consequences. Subsequently, this may result in the activation of personal norms for action.



259 visible refurbishment in the neighbourhood etc. In summary, sociological research argues that energy-related  
 260 renovations are a social practice (Bartiaux et al. 2014).

261 ***SYNTHESIS: AN INTEGRATED MODEL TO EXPLAIN ENERGY EFFICIENCY INVESTMENT***

262 The different theories and models provide insights into decision-making processes from different disciplinary  
 263 perspectives. However, to effectively deal with the complexity of energy efficiency investment, approaches must  
 264 be integrated. Stern (2000) created an integrated model combining the individual and contextual spheres of a  
 265 decision-making process. Within these two spheres he identifies four different dimensions affecting individual  
 266 decision-making. First is the individual (pro-environmental) attitude towards an investment (he also recommends  
 267 using VBN theory to help explain pro-environmental behaviour). Second are habits, meaning how an investment  
 268 fits into long-established routines and behavioural patterns. However, Guagnano et al. (1995) point out that the  
 269 effects of values, beliefs, norms, habits etc. decrease when contextual factors strengthen. Therefore, Stern (2000)  
 270 expands the model with, third, personal capability, and fourth, a contextual factor dimension. Personal  
 271 capabilities may include financial budget constraints, a lack of information or skills, bias, heuristics etc., but also  
 272 encompass personal networks that motivate or hamper energy efficiency investment. Contextual factors refer to  
 273 social norms and the public perception of energy efficiency, but also reflect market conditions such as funding  
 274 schemes, regulations etc. Contextual factors may also include limitations in terms of the availability of  
 275 technology or infrastructure.



276  
 277 **FIGURE 1: INTEGRATED DECISION-MAKING MODEL FOR ENERGY EFFICIENCY INVESTMENT**

278 Source: adapted from Wilson and Dowlatabadi (2007) based on Stern (2000); explanatory constructs based on  
 279 case study

280 **METHOD**

281 The decision-making processes of SPL were investigated through semi-structured, qualitative interviews  
 282 (Lamnek and Krell 2010, p. 247). Due to the limited knowledge about SPL, this type of exploratory, in-depth  
 283 interview is preferable to more structured forms of interviews as it allows the interviewees to describe their  
 284 decision-making processes, their concerns, the barriers they face and their motivation in a very open and detailed  
 285 way. Information and insights are driven by the personal perspective of the respondent rather than by the  
 286 interviewer’s perception of the topic. The aim of this qualitative research was to understand “how” and “why”  
 287 SPL invest in their properties. It allows the author to identify aspects that deter or motivate SPL to invest.  
 288 However, this method does not allow for insights into the relative and quantitative importance (“how much”) of  
 289 each aspect (Crouch and McKenzie 2006; Flyvbjerg 2006). For this, a written survey is planned for a later stage

290 of the research (mixed method), with a view to triangulating both methods to gain a more comprehensive picture  
291 of the decision-making process. Despite the open nature of the interviews, the author ensured that the following  
292 aspects were discussed in every interview: information about the building (age, ownership, tenants etc.) and the  
293 owner (socio-demographic, relationship to the building etc.), general and energy efficiency investment (what  
294 was done, reasons for or against an investment etc.), attitude towards the 'German Energiewende' and  
295 environmental issues, and perception and attitudes towards development in the neighbourhood. The distinction  
296 between different types of investment was crucial to understand whether the value of investments made are in  
297 general high or low, and what the priorities are for investment. The discussion about the 'Energiewende' helped  
298 to identify pro-environmental awareness and how this may contribute to pro-environmental behaviour, as  
299 discussed in environmental psychology theories. The relationship between the owner and the rental property and  
300 their perception of the neighbourhood allows for valuable insights into how far the owner feels a part of the local  
301 community and how responsible they feel for the rental property, the tenants and the neighbourhood.

302 As a case study for this research, the author identified the urban neighbourhood 'Alt-Oberhausen' in the city of  
303 Oberhausen. Oberhausen is a German city in the Ruhr area with approximately 212,000 inhabitants. Its  
304 development is closely linked to the rise of the coal and steel industry at the end of the 19<sup>th</sup> century (März et al.  
305 2013). The beginning of the decline of this branch of industry in the 1950s led to enormous socio-economic  
306 challenges for the city (Blume 1996; Dellwig and Richter 2012). The city lost more than 50,000 inhabitants in  
307 the last half century and has one of the highest levels of debt per capita in Germany (Pagel 2012). Residents of  
308 Oberhausen also have one of the lowest rates of income per capita of all large German cities. The population  
309 decline contributes to a surplus of dwellings, leading to a disproportionate vacancy rate of 5.5%<sup>9</sup>, as well as low  
310 and stagnating rents. The median rent for new tenants was €5.51/m<sup>2</sup> in 2015, which is in the lower third of all  
311 cities in the Ruhr area and clearly below the prosperous markets in North-Rhine Westphalia such as Cologne  
312 (€10.00/m<sup>2</sup>), Düsseldorf (€9.63/m<sup>2</sup>) or Münster (€9.23/m<sup>2</sup>) (LEG 2016).

313 The general condition of the city differs between neighbourhoods, with relatively wealthy neighbourhoods in the  
314 north and northwest of the city and problem areas in the south and east of the city. The neighbourhood selected  
315 for this study, with 13,300 inhabitants, was once the prosperous historic city centre of Oberhausen with high-  
316 quality shops of good reputation within the city and even the region. It was also a popular residential area due to  
317 its proximity to shopping facilities, parks and public transport facilities (e.g. the central train and bus stations).  
318 However, in the early 1990s, local authorities awarded an investor the building permit to redevelop an industrial  
319 brownfield site with a huge shopping mall called CentrO – the second largest shopping mall in Germany.  
320 Subsequently, the inner-city neighbourhood lost its retail status and, consequently, its prestige as a residential  
321 area (Brune and Pump-Uhlmann 2009). Today, the neighbourhood is characterised by high vacancy rates of up  
322 to 9%, a high rate of unemployment (17%), a high percentage of migrants (36% to 43%) and average rental  
323 values of less than €5/m<sup>2</sup>. Due to the long history of the neighbourhood, the building stock is mainly privately  
324 owned and approximately 50% of all the residential buildings in this neighbourhood are owned by SPL.

325 In total, the author carried out 18 interviews of between 37 and 115 minutes in length. All the interviewees own  
326 property in the neighbourhood (see Table 1). The interviewees were contacted by phone and, if suitable, face-to-  
327 face meetings were arranged (this was possible in all but two cases). All the interviews were transcribed  
328 (Dresing and Pehl 2013) and analysed using content analysis (Mayring 2010). The interviews were conducted  
329 until a theoretical saturation was reached (Strauss 1991, p. 49), although the number of interviews was in line  
330 with other qualitative research studies in the field of building energy consumption (Galvin 2015). The sampling  
331 was 'purposeful' (Patton 1990, p. 169). This means that in contrast to probability sampling, where  
332 generalisations are looked for, the focus was on identifying meaningful cases, which could be used to distinguish  
333 and understand those aspects that foster or hinder energy efficiency investment. In qualitative and quantitative  
334 research, cases that show desired behaviour are selected. The supposition is that if we can understand the  
335 motives of this group, we learn how to treat others in the group. Due to the low rate of energy renovations (less  
336 than 1% per year), it seems doubtful that the opinions of a few renovators could accurately represent all SPL

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<sup>9</sup> According to the latest LEG-Housing Market Report, the average vacancy rate in North-Rhine Westphalia was 3.1% and the German average was 3.0% (LEG 2016).

337 and, therefore, interviewing only the renovators would be unlikely to deliver sufficient productive information  
 338 about how to convince non-renovators. In this study, the sampling aimed for maximum variation (Patton 1990, p.  
 339 172) and therefore both renovators and non-renovators were selected.

340 Finding SPL is challenging in Germany because there is no publicly available database of building ownership  
 341 records. SPL rarely join associations and their home and property addresses are not usually the same. Therefore,  
 342 the author used four different selection strategies: making contact with SPL at thematic events; making contact  
 343 with SPL who applied for and participated in a local urban development funding programme; asking SPL  
 344 interviewees to provide contact details of other SPL who fit the sample criteria (snowball sampling); and visiting  
 345 the neighbourhood to identify positive cases and highly neglected properties.

346 As the sample was limited to SPL in the ‘Alt-Oberhausen’ neighbourhood, the findings are only valid for this  
 347 target population. The content of the interviews is not representative of prosperous housing markets such as  
 348 Berlin, Munich, Cologne etc. However, it should be comparable to other SPL with properties in urban  
 349 neighbourhoods with comparable framework conditions (high vacancy rates, low rents, relatively old building  
 350 stock and a high share of low-income households). Such neighbourhoods exist in different parts of Germany,  
 351 such as Saarland, Bremen, in parts of the former GDR and, of course, in other cities of the Ruhr area. wmr  
 352 (2014) conducted an analysis for the Ruhr area and grouped neighbourhoods according to their difficulty in  
 353 securing energy efficiency investment. The authors concluded that the old industrial core of the Ruhr area (of  
 354 which the case study area is an example) demonstrates framework conditions, which serve as barriers to energy  
 355 efficiency investment.

356 TABLE 1: INTERVIEWEE CHARACTERISTICS

Interview label	Interviewee characteristics	Property characteristics	Interview length (min)
IP 1a	Female, in her early 80s, widow, retired, living in one of the apartments in the building, no other rental properties, property owner	4-storey multi-family house with 9 apartments, built in 1954, always been in family ownership, inheritance	115 min
IP 1b	Middle-aged female, professional, daughter		
IP 2a	Female, in her 70s, widow, retired, living in one of the apartments in the building, no other rental properties	3-storey multi-family terraced house with 4 apartments, built c.1900, representative façade decoration, inheritance	53 min
IP 2b	Middle-aged female, retired, daughter, property owner yet mother has usufruct rights, no other rental properties		
IP 3 (phone)	Male, in his early 60s, professional, living in one of the apartments in the building, no other rental properties	3-storey multi-family house with 4 apartments, built in 1911, representative façade decoration, inheritance	37 min
IP 4	Middle-aged female, professional, additional apartments rented out in other cities	4-storey multi-family detached house with 5 apartments, built in 1955, purchased in 2012	67 min
IP 5 (phone)	Middle-aged male, self-employed (property manager), additional rental apartments in other cities	4-storey multi-family house with 9 apartments, built in 1955, purchased in 1998	85 min
IP 6	Middle-aged male, professional, part of a community of heirs with 3 houses, additional houses outside the neighbourhood	3 multi-family houses (3 and 4 storeys) with a total of 28 apartments, built in the early 1950s, properties inherited	75 min
IP 7	Male, in his early 60s, self-employed, additional rental apartments outside the district	2 multi-family houses with 12 apartments, recently built	37 min
IP 8	Middle-aged male, professional, no other rental properties	4-storey multi-family house with 3 apartments and a commercial unit, built in 1955, purchased in 2014	62 min

IP 9	Middle-aged male, self-employed, additional rental properties outside the city	3-storey detached multi-family house with 18 small apartments, constructed before 1919, reconstruction after 1945, purchased in 1997	65 min
IP 10 a	Male in his late 30s, professional, living in one apartment in the house, no other rental property	2-storey multi-family house with 3 apartments, constructed before 1919, purchased in 2008	73 min
IP 10 b	Female in her late 30s, professional, living in one apartment in the house, one additional apartment in the district		
IP 11	Female in her early 60s, retired, lives outside Oberhausen, further apartments outside the district	4-storey multi-family house with 6 apartments and one commercial unit, reconstructed after 1945, inheritance	45 min
IP 12	Male in his late 80s, retired, lives outside Oberhausen, one additional apartment outside Oberhausen	1 single-family house and 1 multi-family house with 3 apartments, built in 1898, inheritance	45 min
IP 13 a	Female in her middle old age, retired, lives outside Oberhausen. Lived in the house during her childhood, owner of the building, no other rental properties	3-storey multi-family house with 5 apartments and 2 commercial units, constructed before 1919, in family possession for more than 80 years, leased out until 2012	76 min
IP 13 b	Middle-aged male, professional, son of IP 13a, managing the property for his mother		
IP 14	Middle-aged female, professional, living in the property, one other rental property in Oberhausen (house)	3-storey multi-family house with 5 apartments, built before 1919, purchased in 2013	59 min
IP 15	Middle-aged male, self-employed, lives outside Oberhausen, other rental properties	2 multi-family houses, one with 19 apartments and 3 commercial units, one with 10 residential and commercial units, built after 1945, purchase and inheritance	
IP 16	Middle-aged male, self-employed, lives outside Oberhausen, no other rental properties	2 multi-family houses, one with 5 apartments and 2 commercial units, one with 3 apartments and one commercial unit, built after 1945, purchased in 2011	37 min
IP 17	Middle-aged male, professional, lives outside Oberhausen, additional apartments outside Oberhausen	4-storey multi-family house with 4 apartments, built in 1960, always been in family possession, inheritance	79 min
IP 18	Middle-aged male, self-employed, lives in Oberhausen, one additional house in the district	4-storey multi-family house with 10 apartments and one commercial unit, built after 1945, purchased in 2013	42 min

## 357 RESULTS

358 The author analysed the interviews according to the aforementioned model adapted from Stern (2000). A total of  
359 13 explanatory constructs were identified and assigned to the four dimensions mentioned above (see Figure 1). A  
360 brief overview of each construct and how it influences the decision-making process of SPL follows.

### 361 (PRO-ENVIRONMENTAL) ATTITUDE

362 The methodology used did not allow for the identification of a hierarchical model, as supposed in VBN theory<sup>10</sup>.  
363 However, the interviews revealed some indications that *environmental awareness* and *personal norms* in

<sup>10</sup> A structural equation model (SEM) is planned at a later date as part of the project to confirm or reject theoretical assumption of the VBN theory.

364 particular play an important role in explaining landlords' investment decisions in terms of energy efficiency.  
365 Respondents showed broad support for environmental issues, which is in line with other research (Borgstedt et  
366 al. 2011). Climate change is seen as a severe challenge for mankind and the 'German Energiewende' is  
367 recognised as the main solution strategy. Interestingly, the most dominant view of the 'Energiewende' is as a  
368 transition of the power system. The SPL did not generally recognise their own responsibility with regard to  
369 emissions from heating their own buildings (value-action gap) (Kollmuss and Agyeman 2002). Emissions from  
370 other sectors (e.g. agriculture, aviation etc.) were considered to be more relevant and many of the interviewees  
371 argued that the tenants' own behaviour in terms of heating their homes is of greater significance than the  
372 physical state of the buildings with respect to the energy efficiency performance. As a result, even those  
373 interviewees who invested in energy efficiency did not feel morally obligated (*personal norm*), demonstrating  
374 that pro-environmental awareness does not necessarily lead to pro-environmental action.

375 "*Why should I do that? Because I'm an environmentalist? Germany is a small country and Merkel made it her*  
376 *priority to be a role model. This is ridiculous. As long as we support the lignite industry, what does she want*  
377 *from us private home owners?" (IP 5)*

## 378 HABITS

379 Most of the interviewees had regularly invested in their buildings in the previous year. Investment strategies  
380 were almost identical for all interviewees and indicate a typical *investment routine*, consisting of three main  
381 aspects. First, most respondents are conservative and risk averse. They reject loans and would rather invest using  
382 their own money. Second, a stepwise investment routine develops. Reserves are saved until an investment is  
383 financed. Then saving for the next investment can start again.

384 "*If I have any work done, it will be financed by the previously received rents" (IP 12)*

385 Third, investments follow a hierarchy with maintenance being the highest priority. Small problems are fixed  
386 immediately to avoid larger problems in the future (broken windows, roof damage, water/wastewater pipes etc.).  
387 Investment is also made to increase the likelihood of finding new tenants or to ensure long-standing tenants  
388 remain happy (e.g. electricity, bath, floor, staircase renovation etc.). Investment that is not essential for managing  
389 the property is at the bottom of the list of priorities (e.g. energy efficiency and aesthetic improvements). Many  
390 interviewees inherited their properties and they tend to invest in similar ways as their parents, grandparents or  
391 other relatives. As energy efficiency was not a relevant issue for previous generations, the current landlords have  
392 not learned this aspect from past experiences.

393 The interviewees convinced the author that investment decisions are driven by social responsibility to tenants  
394 and by an *emotional relationship* with the building or the neighbourhood, rather than by selfish thoughts of  
395 profit<sup>11</sup>. This does not mean the rental properties might incur losses, but if all the management and maintenance  
396 costs are covered by the rent and perhaps some extra money is generated, the vast majority of the interviewees  
397 are satisfied.

398 "*My heart goes out to this house and it hurts to see this neighbourhood deteriorating if nobody invests. This is*  
399 *also why I do invest" (IP 3)*

## 400 PERSONAL CAPABILITIES

401 Stern (2000) argues that individual beliefs, values, habits or norms form a predisposition towards a specific  
402 decision (e.g. investing in renovations to improve energy performance), but do not necessarily contribute to an  
403 investment if individual capabilities or contextual factors deter individuals from following their own conviction.  
404 One of the main barriers mentioned in the interviews was the life-phase of the interviewees. SPL are older than  
405 the average population. According to a nationwide survey, 57% of all German SPL are 60 years or older

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<sup>11</sup> This is, of course, a very subjective assessment and results might be influenced by the unfamiliar nature of the interview, but almost all interviewees displayed a strong relationship with their rented house. They once lived there themselves, or close by in the neighbourhood. Relatives lived or still live there and many know their tenants personally. Many of the interviewees have additional incomes and consider the rent as extra money that is welcome but not crucial for their own standard of living.

406 (Cischinsky et al. 2015, p. 83). This life phase affects results in three ways. Firstly, the rental income forms part  
407 of their pension, so SPL have to look at their current income requirements and consider the long payback period  
408 of energy efficiency investment. Secondly, in some situations, property management is handled by descendants  
409 of the respondents. In this case, large-scale investment (e.g. in energy efficiency) is postponed until the  
410 ownership structure is clarified between heirs. Thirdly, the older the SPL are, the less willing they are to invest.  
411 Reasons for this include their risk averse nature and dislike of debt, as already mentioned, but also the  
412 organisational burden of large-scale investment. All these *individual burdens* may reduce their willingness to  
413 invest in energy efficiency.

414 “You know what, the government wants us to take care of our pension savings. This house is supposed to pay for  
415 the care service or even the care home for my mother. You can only spend each Euro once” (IP 1b, postscript)

416 Another aspect is a profound *knowledge* gap about energy efficiency. The knowledge gap refers to available  
417 technologies (e.g. ventilation systems for avoiding mould) and costs but also to subjective self-assessment of  
418 one’s own knowledge. Consequently, many of the interviewees demonstrate bias, heuristics and misjudgements.  
419 Most overestimate the energy performance of their buildings (overconfidence bias). This assessment is even  
420 underpinned by their energy efficiency certificates. In addition, many SPL do not see any further energy  
421 efficiency potential for their buildings, although their final energy consumption varies between 110 and 170  
422 kWh/m<sup>2</sup> p.a.

423 “I have a 48cm thick wall. That’s an insulation value of 100%. There are no heat losses. It is as if I installed a  
424 12cm polystyrene insulation on a normal wall. That would give me a 100% insulation value as well” (IP 9)

425 The lack of knowledge also contributes to negative *prejudices* associated with renovations Against the  
426 background of the housing market (see below), energy efficiency investments are not considered to be  
427 economically viable. This was a common argument and echoed other studies, yet it was far from being the only  
428 one. Some interviewees argue that wall insulation increases fire risks and causes hazardous waste. In this  
429 context, respondents also had reservations about polystyrene, the most commonly used wall insulation material  
430 in Germany.

431 “IP 8: First of all, I don’t want to wrap my house in polystyrene

432 Interviewer: Why?

433 IP 8: Because it would be horrible to live in a plastic box” (IP 8)

434 Others doubt the ecological benefit, claiming that the energy use for the production, transportation and disposal  
435 of materials would exceed the expected heating savings. A few also voiced concerns about the impact on the  
436 variety of architectural styles and historic buildings because wall insulation would contribute to a monotonous  
437 cityscape. However, the most notable concern – highlighted by almost all respondents – is the fear of mould  
438 appearing due to the inadequate ventilation of their properties by their tenants, a matter over which they have no  
439 control. Even those who have invested large sums in energy efficiency are afraid of mould (an example of  
440 *prejudice*).

441 “So, I wouldn’t rip out the windows because that would damage the façade. If we had completely airtight  
442 windows I would have a mould problem because of the way they [the tenants] use the heating. They tilt the  
443 window and when they close it, the humidity remains inside. And so I’d rather keep the windows the way they  
444 are. They are from the 80s and already double-glazed” (IP 4)

445 The lack of knowledge also contributes to cognitive distortion between the fact of having made an energy  
446 efficiency investment and the time it was done. For example, the respondents consider rooftop insulation or  
447 double-glazed windows from the 1980s as being sufficiently energy efficient and not in need of replacement  
448 provided they are functional (*recent actions*).

449 From the perspective of the author, this lack of knowledge can be explained by two main factors. Firstly, the  
450 interviewees only own a few flats<sup>12</sup> and as letting is only a supplementary income, SPL usually have little  
451 experience in the property sector. Secondly, only one of the interviewees belonged to a homeowners' association  
452 (e.g. Haus&Grund) and SPL do not tend to network with each other (*personal networks*). Both these factors lead  
453 to time constraints regarding information gathering. Most respondents have limited access to good-practice  
454 examples, but extensive access to the mainly negative reporting in the media.

## 455 CONTEXTUAL FACTORS

456 One of the main contextual factors all interviewees mentioned was the negative *neighbourhood development* in  
457 the past. The neighbourhood has undergone tremendous structural changes, which negatively affected its image  
458 and reduced the quality of existing technical and social infrastructure etc. – all of which reduces the desirability  
459 to invest. Consequently, there was hardly any increase in rental value over the last two decades and filling vacant  
460 properties is a permanent challenge. Therefore, many interviewees stated that the *rental market* serves as an  
461 obstacle to energy efficiency investment. Due to the low rental demand, the cost costs of energy efficiency  
462 investment cannot be passed on to tenants despite there being a legal basis for doing so. Many respondents are  
463 worried that if they increased the rent, their tenants would move to vacant flats nearby and they would also incur  
464 extra costs for finding new tenants.

465 *“Yes, you can increase the rent. Then you have a higher rent but an empty apartment” (IP 2)*

466 The *tenant structure* also consists of many benefit claimants or low-paid workers with a lower level of  
467 education. According to the statements made by many interviewees, this group of tenants prefers investment to  
468 be made in the bathrooms, floors or staircases instead of “invisible” energy efficiency investment. This is in line  
469 with a study carried out by Kholodilin et al. (2016) for Germany<sup>13</sup>.

470 Net rent and heating costs for benefit claimants are paid by the local authority in line with social legislation. The  
471 problem in Oberhausen, as in most other cities in Germany, is that these costs are considered in isolation. This  
472 means that an increase in net rent due to energy efficiency investment may force the tenant to move out because  
473 the local authority will only pay rent up to a fixed limit, even though heating costs are reduced.

474 *“We didn’t use § 559 BGB and didn’t increase the rent either because we are in a 5 Euro rental market and for  
475 us, it was safer than causing tenants to move out. It’s a matter of individual philosophy. For me, it is difficult to  
476 demand a higher rent for a standard apartment just because of a thermal retrofit. This would be risky because  
477 due to the low demand people may move two or three houses down the road. They don’t appreciate it. In the end,  
478 every additional Euro they have to pay counts. And then, of course, there are social legislation requirements.  
479 You are not allowed to increase the rent, otherwise the tenants have to move out” (IP 15)*

480 Another aspect mentioned by some interviewees is the city’s tight budgetary situation. The city’s debt has led to  
481 job cuts, which makes the planning application process time-consuming. In addition, the city has increased the  
482 cost of public services such as water, wastewater treatment, waste disposal etc., which limits the margin for net  
483 rent increases by SPL.

484 *“You need to keep an eye on your incidental costs because this really is a criterion for letting. [...] We have the  
485 problem that the city of Oberhausen likes to request money. We have the highest possible property tax in North  
486 Rhine-Westphalia. [...] We also have our ruinous incineration plants operated by the municipal company that  
487 likes to take money from residents. These are all costs I have to pass on to the tenants. If I increased the rent it  
488 would just get more complicated to rent the apartment due to the high incidental costs” (IP 6)*

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<sup>12</sup> This is in line with representative nationwide surveys (Cischinsky et al. 2015; Schätzl et al. 2007). According to Cischinsky et al. (2015, p. 80) 65% of all SPL possess less than 6 dwellings and 95% less than 16 dwellings.

<sup>13</sup> In this study, tenants’ willingness to pay higher rents increases increase by 0.02% for every kWh/m<sup>2</sup> final energy saved. However, the willingness increased by 6.8% if the rent included a kitchen. This means that a mathematical increase in energy efficiency by 340 kWh/m<sup>2</sup> has the same effect as a kitchen.

489 Finally, all the interviewees stated that the current policy of fostering energy efficiency is contradictory.  
490 Requirements are seen as being too ambitious and technically impossible, or disproportionately expensive, and  
491 funding schemes are considered to be too bureaucratic with too many additional requirements (e.g. expert  
492 assessments etc.).

493 *“In those days, we had the opportunity to get KfW funding for our new windows. However, such funding*  
494 *schemes do not make it easy for the consumer. You are overburdened with specialised terminology. You are*  
495 *overburdened with the number of steps you have to take. It really felt as if I was being put off. It was too*  
496 *complicated for me to read everything and so on. Then I said, we will take out a normal loan because everything*  
497 *else was too regulated [...]. That’s the point with all funding schemes. If you are planning any energy efficiency*  
498 *measures, there are always requirements, like you need to install 19 cm polystyrene instead of 17 cm. Then I*  
499 *said, I do not want to be restricted in my decisions and I want to do it the way I like it. It was a bureaucratic*  
500 *maze for me” (IP 10)*

## 501 POLICY NEEDS

502 The findings from the qualitative research not only shed light on the black box decision-making processes of a  
503 widely neglected actor in the ‘German Energiewende’, they also offer some policy recommendations to better  
504 target the needs of SPL. The following recommendations are initial and not final thoughts. Many require  
505 additional discussions and research to become more precise and empirically sound. They are presented as food  
506 for thought – ideas about how to adapt and expand the existing policy framework to boost energy efficiency  
507 more effectively<sup>14</sup>. Recommendations are made within the four dimensions of the personal and contextual sphere  
508 of the theoretical decision-making process but should always be implemented as complete policy packages –  
509 meaning that communication strategies, regulations or financial incentives must be aligned (Thomas et al. 2013).

510 Within the personal sphere, it is clear that pro-environmental awareness does not automatically translate into  
511 pro-environmental behaviour. Information and campaigns to make SPL aware of their responsibility to  
512 contribute to the success of the ‘Energiewende’ – and by doing so to enhance their feelings of moral obligation –  
513 could be a successful driver for increasing the willingness of SPL to invest in energy efficiency. However,  
514 changing environmental attitudes and beliefs is an enormous challenge and can only be achieved in the long term  
515 by socio-cultural transitions (Kopatz 2013).

516 A more practical approach, and one with immediate impact, is to adapt the funding scheme to the specific  
517 investment routines of SPL. Two aspects should be mentioned. First, a paradigm shift in public funding from  
518 subsidised loans towards grants, which should also include a discussion about the level of funding. Weiss et al.  
519 (2012) argue that existing grants or redemption subsidies between 7.5% and -15% for single measures, or up to  
520 30% for comprehensive renovations, tend to encourage free-riders renovation rather than to support additional  
521 investment. In addition, a discussion about the funding architecture of the KfW is required. As explained earlier  
522 in this paper, comprehensive energy renovations are eligible for higher funding than single measures. However,  
523 the investment strategy of SPL is basically incremental, in order to keep investment costs and personal efforts  
524 manageable, to avoid conflict with tenants and reduce investment risk. As a result, comprehensive renovation  
525 carried out in one go receives higher funding than implementing exactly the same measures over a 5 to 10-year  
526 period. The latter better reflects the typical investment routine of SPL. On-site consulting from BAFA already  
527 promotes the option of long-term renovation roadmaps instead of total renovation towards ‘KfW Effizienzhaus’  
528 standards. KfW funding should be similarly adapted. Funding should be based on compliance with the final  
529 energy efficiency standard after a long-term renovation process (e.g. 5-10 years). This would allow SPL who  
530 commit to ambitious energy efficiency standards to spread their investment over a period of time, which is more  
531 in line with their routine, while still ensuring higher funding than for stepwise single measures.

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<sup>14</sup> More radical policy innovations, such as renovation obligations (Friege 2016) or a CO<sub>2</sub> tax, are discussed in the scientific community and to some extent also at political levels, but do not seem likely to be implemented in the near future.



532 The analysis reveals that a profound knowledge gap exists, leading to bias, prejudice and misjudgements etc.  
533 Therefore, tailor-made information and communication is required – and the existing communication channels  
534 must be improved. The amount of available information, including brochures, websites, energy consultants and  
535 the tools needed to assess the energy performance of a building, has increased recently. However, the majority of  
536 SPL are over 60, meaning that they may not access the vast volume of online information as they are less likely  
537 than younger generations to use websites or search engines often, having lived most of their lives without a PC  
538 or access to the internet. Studies also show that sending information via post is not particularly successful  
539 (Gossen and Nischan 2014, p. 13). Therefore, personal contact is required. The pilot project  
540 ‘InnovationCityRuhr’ demonstrated that a consultation visit might contribute to a significant increase in energy  
541 efficiency investment. Employees from neighbourhood offices may also be relevant gatekeepers, as they are  
542 perceived to be neutral, and forums should be established where SPL can get to know each other. This presents a  
543 challenge as SPL do not always live near their properties, but studies show that, on average, 85% of all SPL live  
544 a maximum distance of 50km from their property (Cischinsky et al. 2015, p. 74). This obstacle could be  
545 surmounted if landlords consider such forums useful. Bringing SPL together is important because many  
546 interviewees feel as if they are “lone fighters”. Opportunities to meet other SPL could lead to a shift in the way  
547 in which they view energy efficiency by providing good-practice examples and a stronger sense of responsibility  
548 for their buildings and the neighbourhood. It could also facilitate information gathering due to mutual learning.  
549 Hope and Booth (2014) even call for a mandatory government-led association to provide better accessibility for  
550 SPL. In this context, greater consideration should be given to energy efficiency improvements at neighbourhood  
551 level instead of solely at property level.

552 Improvements in information and communication strategies are a first step in reducing the knowledge gap.  
553 However, knowledge must lead to the desired action. Studies show that the regulations relating to EnEV are not  
554 enforced (Weiss et al. 2012; Ziehm 2010), and this is supported by comments made by the interviewees in this  
555 study. SPL are not aware of the mandatory retrofitting or ignore the regulations as they do not fear the penalties.  
556 Therefore, Weiss et al. (2012) propose random audits; i.e. site visits to apartment buildings on a random basis to  
557 ensure compliance with EnEV regulations. From the author’s perspective, this would seem to be too time-  
558 consuming, but energy audits should be mandatory at the point of a change in ownership. Such audits should not  
559 be limited to the sale of properties, but should also apply to properties that change hands due to inheritance or  
560 donation, as 30% of all SPL do not come into possession of residential buildings and flats through purchase  
561 (Cischinsky et al. 2015, p. 96). Some audits do already exist in Germany; e.g. chimney sweeps ensure the  
562 replacement of old and inefficient boilers to enforce EnEV regulations. Their activity could be expanded to  
563 include other regulations, or new inspection authorities could be introduced. Audits should be mandatory for  
564 every change of ownership and relevant certificates should be part of mortgage documents or notarial  
565 paperwork. This would ensure that property sellers and buyers were aware of mandatory retrofitting. As a  
566 consequence of this policy, the vendor of the property could implement the required energy efficiency measures  
567 to increase the value of the property, otherwise the new property owner would be obliged to carry out the work.  
568 This would be documented via the selling process, which makes enforcement easier.

569 Generally, a change of ownership should be used as a “window of opportunity”. In view of the current low  
570 interest rates, many Germans consider property as a good investment and due to the average age of SPL, high  
571 levels of change in ownership are expected over the next two decades. The authorities should make more use of  
572 this opportunity, because awareness and willingness to invest are higher when a property is in new hands. Many  
573 German cities provide welcome packages for new residents including free public transport tickets, tickets for  
574 cultural programmes etc. As an extension of this approach, free energy consultancy could be provided for new  
575 property owners – delivered with the property transfer tax information. Energy consultancy could also become  
576 mandatory for every new property owner.

577 Many interviewees cited financial or time constraints, and the organisational effort required, as factors deterring  
578 them from making energy renovations, particularly in light of their relatively advanced average age. The above  
579 mentioned changes in funding schemes could be a first step in the right direction. The adaptation of the German  
580 tax system could provide another incentive. Making energy renovations tax deductible has been discussed for  
581 some time, but opportunities are currently limited and only possible over long time periods. Changes in property  
582 taxes offer another opportunity to make energy efficiency investment more financially attractive. Property taxes

583 could be calculated based on the combination of property size and energy efficiency performance (measured by  
584 the ECP), instead of being based on the market value of the property (Bürger 2012, p. 43). In the USA, local  
585 authorities also provide bonds to investors which are repaid via the annual assessment of the property tax bill  
586 over a selected time period (Property Assessed Clean Energy, PACE) (Fuller et al. 2009). This could be of  
587 special interest to older landlords, because the higher property tax will pass to the new property owner after  
588 selling, so personal financial risks are limited.

589 The German government should also acknowledge the diversity of local housing markets in Germany. In  
590 prosperous markets, energy efficiency investments are misused as an instrument for rent increases, while in low  
591 demand markets, it can be harder to pass the costs of thermal insulation on to tenants, despite §559 BGB. This  
592 raises the question whether funding rates should solely reflect the energy efficiency performance of an  
593 investment, or if they should also consider the housing market conditions in which the investment is made. To  
594 take into account the spatial disparities of local housing markets, funding rates could be linked to rental values,  
595 with higher rates for low demand markets (with their low rents and high levels of vacancies) and with lower or  
596 even no support for prosperous markets. This consideration leads to questions that are beyond the scope of this  
597 paper; for example: Which criteria create the greatest needs? How meaningful is it to support structurally weak  
598 regions? Should regions be discriminated against because they perform well? Nevertheless, urban development  
599 funding such as 'Soziale Stadt' or 'Stadtumbau West/Ost' has successfully demonstrated for years that  
600 neighbourhoods or regions can be funded under individual mechanisms.

601 The federal government should also recognise the heterogeneity of building owners and their specific needs, as  
602 well as the diversity of housing markets, in their incentive programmes. The analysis shows that the current  
603 funding schemes are inadequate for addressing the needs of SPL. Funding is too bureaucratic and financially  
604 unattractive, and has too many legal requirements. Adjustments are required. For instance, funding rates could  
605 be restructured to provide higher levels of funding to small-scale owners. This would not exclude large housing  
606 companies, but as they benefit from economies of scale, economies of scope and institutional learning, energy  
607 efficiency investments are already more cost-effective for them (Michelsen et al. 2015). Obligations to provide  
608 proof of specific energy efficiency standards achieved after renovation could also be simplified for small-scale  
609 owners.

610 Urban planning is another dimension that can support energy efficiency, particularly in low demand housing  
611 markets. In 2014, wmr (2014) analysed the potential for harnessing energy efficiency potential in different  
612 housing markets in the Ruhr area. The analysis shows there are fewer opportunities for energy efficiency  
613 investment in neighbourhoods with a lower standard of living. Investment in public places, parks etc. can reduce  
614 the number of residents who move away from the neighbourhood and may attract tenants who are willing to pay  
615 higher rents. In this context, demolition of sub-standard housing to level housing demand and supply should also  
616 be discussed.

617 A further incentive for energy efficiency investment is change in social legislation. Benefit claimants are  
618 important tenants for landlords, particularly in low demand housing markets. Currently, social law hampers  
619 investment in buildings with high percentages of benefit claimants because housing expenses ('Kosten der  
620 Unterkunft', KdU) and heating costs ('Kosten der Heizung', KdH) are paid by the local authorities and are  
621 regulated separately under a system of individual absolute limits that cannot be offset against each other. As a  
622 result, landlords who invest in energy efficiency could lose tenants if their increased rent exceeds the limits, even  
623 though heating costs may be reduced. Alternatives do exist; for example in Offenbach, Bielefeld, where higher  
624 rents are offset by energy savings (Malottki 2012), but currently there is no modification to social legislation  
625 across the whole of Germany.

626 So far, German tenants have rarely appreciated well-insulated buildings (Kholodilin et al. 2016). Hope and  
627 Booth (2014, p. 376) found similar results in the UK and concluded: "unless there is a demand for energy  
628 improvement from the tenant in a market where tenants routinely choose properties with better energy efficiency  
629 and performance, it is difficult to imagine this situation changing". Strategies are required to make energy  
630 efficiency a criterion for renting an apartment, such as the design of the flats, the flooring, the balconies etc. The  
631 existing energy performance certificates (EPCs) fail in this situation because they are neither relevant for tenants  
632 nor contribute to energy efficiency investment (Gram-Hanssen and Christensen 2011). Criticism arises of the co-

633 existence of two variants in Germany – an energy consumption and an energy demand certificate. These two  
634 approaches use different calculation methods, which renders them barely comparable (Weiss et al. 2012).  
635 Raising awareness of energy efficiency among tenants is a long-term challenge that requires societal change.  
636 However, lessons from the past demonstrate that living standards and expectations can be changed.

637

	Findings	Possible policy needs
Environmental attitude	<ul style="list-style-type: none"> <li>Existing environmental awareness and support for the 'German Energiewende'</li> </ul>	<ul style="list-style-type: none"> <li>Information and campaigns</li> </ul>
	<ul style="list-style-type: none"> <li>No moral obligation to invest in energy efficiency</li> </ul>	
Habit	<ul style="list-style-type: none"> <li>Sequential investment routine (to reduce financial and organisational risks and to keep it simple)</li> </ul>	<ul style="list-style-type: none"> <li>Establish renovation roadmaps and equate these with comprehensive renovations</li> <li>Offer the same financial incentives for stepwise as for comprehensive renovations, if both achieve equal energy performance standards</li> </ul>
	<ul style="list-style-type: none"> <li>Debt averse</li> </ul>	<ul style="list-style-type: none"> <li>Shift funding schemes from subsidised loans to grants</li> <li>Offer flexible funding conditions (e.g. different funding rates for different owner types)</li> <li>Identify funding rates that really serve as an impetus for action</li> </ul>
	<ul style="list-style-type: none"> <li>Emotional relationship with the rental properties and the neighbourhood</li> </ul>	<ul style="list-style-type: none"> <li>Invest in public places and neighbourhood development to keep areas attractive</li> </ul>
Personal capability	<ul style="list-style-type: none"> <li>Lack of knowledge                             <ul style="list-style-type: none"> <li>Overestimation of existing energy efficiency performance and underestimation of energy saving potential of properties</li> <li>Technological alternatives are unknown</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Provide better access to good-practice examples and foster exchange between landlords (e.g. regular forums)</li> <li>Disseminate tailor-made information and communication (e.g. personal contact instead of online platforms)</li> <li>Make energy audits mandatory for every change in ownership (including mandatory retrofitting requirements) as part of the notarial certification</li> <li>Offer a free energy consultation to every new property owner</li> </ul>
	<ul style="list-style-type: none"> <li>Prejudice and a dominant perception that energy renovations produce negative impacts (fire risks, mould, lack of economic viability etc.)</li> </ul>	
	<ul style="list-style-type: none"> <li>Misjudgement of the quality/longevity of past investment in energy efficiency</li> </ul>	
	<ul style="list-style-type: none"> <li>Low level of organisation and high barriers to information gathering</li> </ul>	<ul style="list-style-type: none"> <li>Create a mandatory government-led association</li> <li>Facilitate regular neighbourhood forums</li> </ul>
	<ul style="list-style-type: none"> <li>Life-phase and financial restrictions as obstacles</li> </ul>	<ul style="list-style-type: none"> <li>Improve funding schemes (see above)</li> <li>Improve tax deductibility</li> <li>Change property tax (e.g. include energy efficiency performance criteria in property tax, PACE funding)</li> <li>Offer organisational support</li> </ul>
Contextual factors	<ul style="list-style-type: none"> <li>Low rent levels and limited opportunity to pass renovation costs on to tenants due to rental market conditions</li> </ul>	<ul style="list-style-type: none"> <li>Adapt funding conditions to savings not investment costs</li> <li>Regionalise funding conditions (e.g. provide additional funding for urban development areas)</li> <li>Improve tax deductibility</li> <li>Invest in public places and neighbourhood development to keep areas attractive</li> </ul>
	<ul style="list-style-type: none"> <li>Low demand for energy efficiency from tenants</li> </ul>	<ul style="list-style-type: none"> <li>Raise awareness about the co-benefits of energy renovations (e.g. reduce draughts)</li> <li>Increase energy prices</li> </ul>
	<ul style="list-style-type: none"> <li>Neglect of energy efficiency performance criteria in social legislation</li> </ul>	<ul style="list-style-type: none"> <li>Include energy performance criteria in social legislation (e.g. offset higher net rents with energy savings)</li> </ul>
	<ul style="list-style-type: none"> <li>High additional costs for local authority public services (waste disposal, wastewater treatment etc.), limiting financial scope to adjust net rents</li> </ul>	<ul style="list-style-type: none"> <li>Beyond the scope of this paper</li> </ul>
	<ul style="list-style-type: none"> <li>Fear of mould (and associated potential renovation costs and conflict with tenants) due to tenants' bad ventilation habits</li> </ul>	<ul style="list-style-type: none"> <li>Establish conditions for fair, fast and transparent dispute resolution with tenants (e.g. free expert reports, arbitration board)</li> </ul>
	<ul style="list-style-type: none"> <li>Lack of attractiveness of funding schemes</li> </ul>	<ul style="list-style-type: none"> <li>Simplify application forms (including the verification process)</li> <li>Move from subsidised loans to grants</li> <li>Adapt funding conditions to savings not investment costs</li> <li>Offer flexible funding conditions (e.g. different funding rates for different owner types)</li> <li>Identify funding rates that really serve as an impetus for action</li> </ul>

639  
640 Source: own compilation

641 **CONCLUSION**

642 This analysis provides insights into the decision-making processes of a neglected actor in the 'German  
643 Energiewende': the small private landlord (SPL). Although SPL own 37% of rented apartments in Germany,  
644 little is known about their decision-making processes in terms of energy efficiency investment. The findings of  
645 this qualitative research indicate that SPL are reluctant to invest in energy efficiency measures, an outcome  
646 which is in line with international studies. The analysis helps to better understand what motivates and deters SPL  
647 from making renovations to improve energy performance and expands on existing arguments in several ways.  
648 Firstly, the interviews were interpreted according to the theoretical multidisciplinary framework. Secondly, this  
649 analysis proved that the decision-making processes of SPL go beyond economic rationality. Existing  
650 explanations, such as the split-incentive or a lack of information, are important but are not the only barriers. A  
651 low level of esteem among tenants, fear of mould due to insufficient ventilation, time constraints, negative  
652 beliefs and attitudes, conservative habits and investment routines, life phases or a negative perception of energy  
653 efficiency within a landlord's personal or social network are some of the many determinants that deter SPL from  
654 making energy efficiency improvements to their properties.

655 The study provides findings about the investment behaviour of SPL in low demand housing markets, while the  
656 public debate in Germany mainly focuses on prosperous markets and related political interventions (e.g.  
657 'Mietpreisbremse'). Due to the explorative character of this study, the author cannot assess whether the results  
658 are representative of SPL in other neighbourhoods or cities, or representative of other housing markets.  
659 However, international research suggests comparable results elsewhere. Therefore, it seems appropriate for this  
660 paper to draw some policy recommendations. Audits could improve compliance with EnEV, in particular when  
661 properties change ownership. Funding should be better tailored to specific contexts instead of taking a "one size

662 fits all” approach. This means that the particular needs of different owner groups and housing markets should be  
663 reflected in the funding conditions, with higher funding for non-professional owners (SPL and homeowners) and  
664 in low demand housing markets. A paradigm shift towards grants instead of subsidised loans is required and  
665 funding schemes should respect the investment routine of SPL by offering grants for incremental investment  
666 instead of only for comprehensive renovations. The rules surrounding tax deductibility should also be improved.  
667 Finally, information campaigns should consider the specific socio-demographics of SPL and face-to-face energy  
668 consultations should take place.

669 The analyses show that further research is required to understand the decision-making processes of SPL in  
670 different housing markets. The qualitative approach used for this study guarantees a deeper understanding of  
671 decision-making processes, but it cannot guarantee comprehensiveness: The results, so far, are limited to one  
672 neighbourhood in one German city and should be complemented by further qualitative and quantitative studies  
673 involving a bigger number of participants and stretching to different types of neighbourhoods and cities in  
674 Germany. In particular, different rental markets and neighbourhood developments might lead to divergent  
675 decision-making processes. This future research will help to validate the results presented in this article and  
676 create a sound evidence base for future policy making that is more nuanced and – as a results – more effective.  
677 The recommendations made in this study are initial thoughts based on this qualitative research and are not yet  
678 proven. However, new ways of thinking are required to tackle climate change. In particular there is a need for  
679 testing several of the ideas presented at local scale, possibly in the form of “real-world” laboratories. Real-world  
680 laboratories play a crucial role in experimenting with new policies and approaches. Here, policies can be  
681 designed in co-creation with landlords and funding or regulation bodies at national and local level. This  
682 cooperative approach of testing and adjusting new policies with their actual target group can help to secure their  
683 accuracy and effectiveness. Moreover it enhances the legitimacy and acceptability of new policies. Therefore,  
684 the author hopes that this paper will provide a productive starting point for a comprehensive debate about how to  
685 wake up a sleeping giant of the German residential housing market.

## 686 REFERENCES

- 687 Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*,  
688 50(2), 179–211. doi:10.1016/0749-5978(91)90020-T
- 689 Ambrose, A. R. (2015). Improving energy efficiency in private rented housing: Why don't landlords act? *Indoor  
690 and Built Environment*, 1420326X15598821. doi:10.1177/1420326X15598821
- 691 Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of  
692 psycho-social determinants of pro-environmental behaviour. *Journal of Environmental Psychology*,  
693 27(1), 14–25. doi:10.1016/j.jenvp.2006.12.002
- 694 Bartiaux, F., Gram-Hanssen, K., Fonseca, P., Ozoliņa, L., & Christensen, T. H. (2014). A practice–theory  
695 approach to homeowners' energy retrofits in four European areas. *Building Research & Information*,  
696 42(4), 525–538. doi:10.1080/09613218.2014.900253
- 697 Barton, B. (2012). *Energy efficiency and rental accommodation: dealing with split incentives. Report for the  
698 University of Waikato Centre for Environmental, Resources and Energy Law*. Hamilton: University of  
699 Waikato. <http://www.otago.ac.nz/centre-sustainability/otago055632.pdf>. Accessed 26 May 2017
- 700 BBSR (Ed.). (2014). *Investitionsprozesse bei Wohnungseigentümergeinschaften mit besonderer  
701 Berücksichtigung energetischer und altersgerechter Sanierungen*. Bonn: Selbstverl.
- 702 Beck, H. (2014). *Behavioral Economics: eine Einführung*. Wiesbaden: Springer Gabler.
- 703 Becker, S., Neubacher, A., Nezik, A.-K., Purtul, G., & Sauga, M. (2014). Verdämmt in alle Ewigkeit. *Der  
704 Spiegel*. <http://www.spiegel.de/spiegel/print/d-130630577.html>. Accessed 15 May 2017
- 705 Bird, S., & Hernández, D. (2012). Policy options for the split incentive: Increasing energy efficiency for low-  
706 income renters. *Energy Policy*, 48, 506–514. doi:10.1016/j.enpol.2012.05.053
- 707 Blume, J. (1996). Oberhausen und der Strukturwandel. *Bauwelt*, 87(45), 2556–2561.
- 708 BMUB. (2016). *Klimaschutzplan 2050. Klimapolitische Grundsätze und Ziele der Bundesregierung*.  
709 [http://www.bmub.bund.de/fileadmin/Daten\\_BMUB/Download\\_PDF/Klimaschutz/klimaschutzplan\\_2050  
710 \\_bf.pdf](http://www.bmub.bund.de/fileadmin/Daten_BMUB/Download_PDF/Klimaschutz/klimaschutzplan_2050_bf.pdf). Accessed 26 May 2017
- 711 BMWi. (2015). *Energy Efficiency Strategy for Buildings. Methods for achieving a virtually climate-neutral  
712 building stock*. Berlin: Federal Ministry for Economic Affairs and Energy.  
713 [http://www.bmwi.de/English/Redaktion/Pdf/energy-efficiency-strategy-  
714 buildings,property=pdf,bereich=bmwi2012,sprache=en,rwb=true.pdf](http://www.bmwi.de/English/Redaktion/Pdf/energy-efficiency-strategy-buildings,property=pdf,bereich=bmwi2012,sprache=en,rwb=true.pdf). Accessed 10 October 2016

- 715 BMWi, & BMU. (2010). *Energiekonzept für eine umweltschonende, zuverlässige und bezahlbare*  
716 *Energieversorgung*. Berlin. <http://www.bmu.de/fileadmin/bmu->  
717 [import/files/pdfs/allgemein/application/pdf/energiekonzept\\_bundesregierung.pdf](http://www.bmu.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/energiekonzept_bundesregierung.pdf). Accessed 30 October  
718 2012
- 719 Borgstedt, S., Christ, T., & Reusswig, F. (2011). *Umweltbewusstsein in Deutschland 2010: Ergebnisse einer*  
720 *repräsentativen Bevölkerungsumfrage*. 2011.
- 721 Broszio, C. (2012). *Immobilieigentümer als Akteure in schrumpfenden Städten : von der “Kunst” der*  
722 *Zusammenarbeit zwischen Stadt und Eigentümern*. Hamburg. <http://edoc.sub.uni->  
723 [hamburg.de/hcu/volltexte/2012/42/](http://edoc.sub.uni-hamburg.de/hcu/volltexte/2012/42/). Accessed 31 March 2015
- 724 Brune, W., & Pump-Uhlmann, H. (2009). *Centro Oberhausen – Die verschobene Stadtmitte: Ein Beispiel*  
725 *verfehler Stadtplanung* (1st ed.). Immobilien Zeitung GmbH.
- 726 Bürger, V. (2012). *Overview and assessment of new and innovative integrated policy sets that aim at the nZEB*  
727 *standard*. [http://www.entranze.eu/files/downloads/D5\\_4/Entranze\\_D5.4\\_05-2012\\_final.pdf](http://www.entranze.eu/files/downloads/D5_4/Entranze_D5.4_05-2012_final.pdf). Accessed  
728 28 May 2017
- 729 Cischinsky, H., Kirchner, J., Vaché, M., Rodenfels, M., & Nuss, G. (2015). *Privateigentümer von*  
730 *Mietwohnungen in Mehrfamilienhäusern* (No. 02/2015). Bonn: Institut Wohnen und Umwelt (IWU).  
731 [http://www.bbsr.bund.de/BBSR/DE/Veroeffentlichungen/BBSROnline/2015/DL\\_ON022015.pdf?\\_\\_blo](http://www.bbsr.bund.de/BBSR/DE/Veroeffentlichungen/BBSROnline/2015/DL_ON022015.pdf?__blo)  
732 [b=publicationFile&v=4](http://www.bbsr.bund.de/BBSR/DE/Veroeffentlichungen/BBSROnline/2015/DL_ON022015.pdf?__blob=publicationFile&v=4)
- 733 Coleman, J. S., & Fararo, T. J. (1992). *Rational Choice Theory: Advocacy and Critique*. Newbury Park: SAGE  
734 Publications Inc.
- 735 Crouch, M., & McKenzie, H. (2006). The logic of small samples in interview-based qualitative research. *Social*  
736 *Science Information*, 45(4), 483–499. doi:10.1177/0539018406069584
- 737 DDIV. (2014). *Kompendium Energetische Sanierung. Praxisnahes Fachwissen für Immobilieverwalter und*  
738 *Wohnungseigentümergeinschaften*. Berlin: Dachverband Deutscher Immobilienverwalter e.V.  
739 [http://ddiv.de/download/CY3b03a98eX1485fb5bb4bX5743/DDIV-Kompendium\\_Energetische-](http://ddiv.de/download/CY3b03a98eX1485fb5bb4bX5743/DDIV-Kompendium_Energetische-)  
740 [Sanierung\\_2-Auflage-2014.pdf](http://ddiv.de/download/CY3b03a98eX1485fb5bb4bX5743/DDIV-Kompendium_Energetische-Sanierung_2-Auflage-2014.pdf)
- 741 De T’Serclaes, P. (2007). *Financing Energy Efficient Homes: Existing Policy Responses to Financial Barriers.*  
742 *February 2007*. Paris: International Energy Agency.  
743 <https://www.iea.org/publications/freepublications/publication/FinancialBarrierBuilding.pdf>. Accessed  
744 11 October 2016
- 745 DECC. (2015). *Final Stage Impact Assessment for the Private Rented Sector Regulations*. London: Department  
746 of Energy and Climate Change.
- 747 Dellwig, M., & Richter, E.-J. (2012). Wirtschaft im Wandel. Oberhausen 1960 bis 2010. In M. Dellwig (Ed.),  
748 *Oberhausen in Wirtschaftswunder und Strukturwandel* (pp. 53–140). Münster: Aschendorff.
- 749 Diefenbach, N., Cischinsky, H., Rodenfels, M., & Clausnitzer, K.-D. (2010). *Datenbasis Gebäudebestand:*  
750 *Datenerhebung zur energetischen Qualität und zu den Modernisie- rungstrends im deutschen*  
751 *Wohngebäudebestand*. Darmstadt: Institut Wohnen und Umwelt (IWU), Bremer Energie Institut (BEI).
- 752 Diefenbach, N., Stein, B., Loga, T., Rodenfels, M., Gabriel, J., & Fette, M. (2015). *Monitoring der KfW-*  
753 *Programme „Energieeffizient Sanieren“ und „Energieeffizient Bauen“ 2014*. Darmstadt/Bremen:  
754 Institut für Wohnen und Umwelt GmbH (IWU). Fraunhofer IFAM.  
755 <https://www.kfw.de/PDF/Download-Center/Konzernthemen/Research/PDF-Dokumente-alle->  
756 [Evaluationen/Monitoringbericht\\_EBS\\_2014.pdf](https://www.kfw.de/PDF/Download-Center/Konzernthemen/Research/PDF-Dokumente-alle-Evaluationen/Monitoringbericht_EBS_2014.pdf)
- 757 Dresing, T., & Pehl, T. (2013). *Praxisbuch Interview, Transkription & Analyse: Anleitungen und Regelsysteme*  
758 *für qualitativ Forschende* (5th ed.). Marburg: Dresing & Pehl.
- 759 Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). New Trends in Measuring Environmental  
760 Attitudes: Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale. *Journal of*  
761 *Social Issues*, 56(3), 425–442. doi:10.1111/0022-4537.00176
- 762 Eadson, W., Gilbertson, J., & Walshaw, A. (2013). *Attitudes and perceptions of the Green Deal amongst private*  
763 *sector landlords in Rotherham*. Sheffield Hallam University.  
764 <https://www.shu.ac.uk/research/cresr/sites/shu.ac.uk/files/green-deal-landlords-rotherham.pdf>.  
765 Accessed 22 April 2016
- 766 Färber, M. (2013). *Energetische und soziale Problemlagen in Berlin: eine GIS-gestützte Untersuchung von*  
767 *energieeffizienter Wohngebäudesanierung im Hinblick auf sozioökonomisch schwache Gebiete* (Vol.  
768 Heft). Berlin: Univ.-Verl. der TU, Univ.-Bibliothek.
- 769 Flyvbjerg, B. (2006). Five Misunderstandings About Case-Study Research. *Qualitative Inquiry*, 12(2), 219–245.  
770 doi:10.1177/1077800405284363
- 771 Fornara, F., Pattitoni, P., Mura, M., & Strazzera, E. (2016). Predicting intention to improve household energy  
772 efficiency: The role of value-belief-norm theory, normative and informational influence, and specific  
773 attitude. *Journal of Environmental Psychology*, 45, 1–10. doi:10.1016/j.jenvp.2015.11.001
- 774 Frieger, J. (2016). Increasing homeowners’ insulation activity in Germany: An empirically grounded agent-based  
775 model analysis. *Energy and Buildings*, 128, 756–771. doi:10.1016/j.enbuild.2016.07.042

776 Frieger, J., & Chappin, E. (2014). Modelling decisions on energy-efficient renovations: A review. *Renewable and*  
777 *Sustainable Energy Reviews*, 39, 196–208. doi:10.1016/j.rser.2014.07.091

778 Frieger, J., Holtz, G., & Chappin, E. J. L. (2016). Exploring Homeowners' Insulation Activity. *Journal of*  
779 *Artificial Societies and Social Simulation*, 19(1), 4.

780 Fuller, M., Kunkel, C., & Kammen, D. (2009). *Guide to energy efficiency & renewable energy financing*  
781 *districts for local governments*. Berkeley: University of California.  
782 [http://www.ci.berkeley.ca.us/uploadedFiles/Planning\\_and\\_Development/Level\\_3\\_-](http://www.ci.berkeley.ca.us/uploadedFiles/Planning_and_Development/Level_3_-_Energy_and_Sustainable_Development/Guide%20to%20Renewable%20Energy%20Financing%20Districts2009.pdf)  
783 [\\_Energy\\_and\\_Sustainable\\_Development/Guide%20to%20Renewable%20Energy%20Financing%20Dis-](http://www.ci.berkeley.ca.us/uploadedFiles/Planning_and_Development/Level_3_-_Energy_and_Sustainable_Development/Guide%20to%20Renewable%20Energy%20Financing%20Districts2009.pdf)  
784 [tricts2009.pdf](http://www.ci.berkeley.ca.us/uploadedFiles/Planning_and_Development/Level_3_-_Energy_and_Sustainable_Development/Guide%20to%20Renewable%20Energy%20Financing%20Districts2009.pdf). Accessed 28 May 2017

785 Gabriel, M., Watson, P., Ong, R., Wood, G., & Wulff, M. (2010). The environmental sustainability of  
786 Australia's private rental housing stock. 125, (1834–9250). [https://www.ahuri.edu.au/research/position-](https://www.ahuri.edu.au/research/position-papers/125)  
787 [papers/125](https://www.ahuri.edu.au/research/position-papers/125). Accessed 2 October 2016

788 Galvin, R. (2014). Why German homeowners are reluctant to retrofit. *Building Research & Information*, 42(4),  
789 398–408. doi:10.1080/09613218.2014.882738

790 Galvin, R. (2015). How many interviews are enough? Do qualitative interviews in building energy consumption  
791 research produce reliable knowledge? *Journal of Building Engineering*, 1, 2–12.  
792 doi:10.1016/j.jobe.2014.12.001

793 Gigerenzer, G., & Gaissmaier, W. (2011). Heuristic Decision Making. *Annual Review of Psychology*, 62(1),  
794 451–482. doi:10.1146/annurev-psych-120709-145346

795 Goderbauer, E. (2007). *Private Eigentümer im Stadtumbau: viele einzelne Eigentümer und unterschiedliche*  
796 *Eigentumsverhältnisse : Chance oder Hemmnis beim Stadtumbau West?* Bonn: Selbstverl. des  
797 Bundesamtes für Bauwesen und Raumordnung.

798 Goode, W. J. (1997). Rational Choice Theory. *American Sociologist*, 28(2), 22.

799 Gossen, M., & Nischan, C. (2014). *Regionale Differenzen in der Wahrnehmung energetischer Sanierungen.*  
800 *Ergebnisse einer qualitativen Befragung von GebäudeeigentümerInnen zu energetischer Sanierung in*  
801 *zwei unterschiedlichen Regionen*. Berlin. [http://www.gebaeude-](http://www.gebaeude-energiewende.de/data/gebEner/user_upload/Dateien/GEW_API_Ergebnisbericht_Interviews_final_141126.pdf)  
802 [energiewende.de/data/gebEner/user\\_upload/Dateien/GEW\\_API\\_Ergebnisbericht\\_Interviews\\_final\\_141](http://www.gebaeude-energiewende.de/data/gebEner/user_upload/Dateien/GEW_API_Ergebnisbericht_Interviews_final_141126.pdf)  
803 [126.pdf](http://www.gebaeude-energiewende.de/data/gebEner/user_upload/Dateien/GEW_API_Ergebnisbericht_Interviews_final_141126.pdf). Accessed 24 October 2016

804 Gram-Hanssen, K. (2014). Retrofitting owner-occupied housing: remember the people. *Building Research &*  
805 *Information*, 42(4), 393–397. doi:10.1080/09613218.2014.911572

806 Gram-Hanssen, K., & Christensen, T. H. (2011). *Energy efficiency in existing detached housing*. SBI forlag.  
807 [http://vbn.aau.dk/en/publications/energy-efficiency-in-existing-detached-housing\(fe26f7b4-cc45-4d96-](http://vbn.aau.dk/en/publications/energy-efficiency-in-existing-detached-housing(fe26f7b4-cc45-4d96-b638-abaab197b7f4).html)  
808 [b638-abaab197b7f4\).html](http://vbn.aau.dk/en/publications/energy-efficiency-in-existing-detached-housing(fe26f7b4-cc45-4d96-b638-abaab197b7f4).html). Accessed 16 October 2016

809 Guagnano, G. A., Stern, P. C., & Dietz, T. (1995). Influences on Attitude-Behavior Relationships A Natural  
810 Experiment with Curbside Recycling. *Environment and Behavior*, 27(5), 699–718.  
811 doi:10.1177/0013916595275005

812 Hägerstrand, T. (1967). *Innovation diffusion as a spatial process*. (A. Pred & G. Haag, Eds.). Chicago, Ill.: Univ.  
813 of Chicago Press.

814 Hanf, S. (2013). *Dämmwahn oder Klimarettung? Vom Sinn und Unsinn der energetischen Sanierung*.  
815 ZDFzoom. [https://www.zdf.de/uri/p12\\_beitrag\\_29132014](https://www.zdf.de/uri/p12_beitrag_29132014). Accessed 15 May 2017

816 Haus&Grund. (2015). *Vermieterbefragung. Ergebnisse 1. Halbjahr 2015*. Berlin: Haus & Grund Deutschland.  
817 [http://www.hausundgrund.de/download.php?dl\\_resource\\_id=57369](http://www.hausundgrund.de/download.php?dl_resource_id=57369). Accessed 2 October 2016

818 Henry, J. F. (2011). *The Making of Neoclassical Economics* (Reissue edition.). London: Routledge.

819 Hines, J. M., Hungerford, H. R., & Tomera, A. N. (1987). Analysis and Synthesis of Research on Responsible  
820 Environmental Behavior: A Meta-Analysis. *The Journal of Environmental Education*, 18(2), 1–8.  
821 doi:10.1080/00958964.1987.9943482

822 Hope, A. J., & Booth, A. (2014). Attitudes and behaviours of private sector landlords towards the energy  
823 efficiency of tenanted homes. *Energy Policy*, 75, 369–378. doi:10.1016/j.enpol.2014.09.018

824 Jaffe, A. B., & Stavins, R. N. (1994). The energy-efficiency gap What does it mean? *Energy Policy*, 22(10),  
825 804–810. doi:10.1016/0301-4215(94)90138-4

826 Kahneman, D. (2003). Maps of Bounded Rationality: Psychology for Behavioral Economics. *American*  
827 *Economic Review*, 93(5), 1449–1475. doi:10.1257/00028280322655392

828 Kahneman, D., Knetsch, J. L., & Thaler, R. H. (1991). Anomalies: The Endowment Effect, Loss Aversion, and  
829 Status Quo Bias. *Journal of Economic Perspectives*, 5(1), 193–206. doi:10.1257/jep.5.1.193

830 Kemp, P. A., & Kofner, S. (2010). Contrasting varieties of private renting - Contrasting varieties of private  
831 renting\_England & Germany.pdf. Presented at the ENHR seminar on “The Future of the Private Rental  
832 Sector: Residual Sector of Cornerstone of Housing Provision?” 5th until 9th February 2010, Sankt  
833 Marienthal.  
834 [http://hofinet.org/upload\\_docs/Contrasting%20varieties%20of%20private%20renting\\_England%20&%](http://hofinet.org/upload_docs/Contrasting%20varieties%20of%20private%20renting_England%20&%20Germany.pdf)  
835 [20Germany.pdf](http://hofinet.org/upload_docs/Contrasting%20varieties%20of%20private%20renting_England%20&%20Germany.pdf). Accessed 1 October 2016

- 836 Kenneth Gillingham, M. H. (2012). Split Incentives in Residential Energy Consumption. *The Energy Journal*,  
837 *Volume 33*(Number 2). <https://ideas.repec.org/a/aen/journal/33-2-03.html>. Accessed 31 March 2016
- 838 Kholodilin, K. A., Mense, A., & Michelsen, C. (2016). Marktwert der Energieeffizienz : deutliche Unterschiede  
839 zwischen Miet- und Eigentumswohnungen. *DIW-Wochenbericht : Wirtschaft, Politik, Wissenschaft*,  
840 *83*(28), 605–613.
- 841 Kiatkawsin, K., & Han, H. (2017). Young travelers' intention to behave pro-environmentally: Merging the  
842 value-belief-norm theory and the expectancy theory. *Tourism Management*, *59*, 76–88.  
843 doi:10.1016/j.tourman.2016.06.018
- 844 Kollmuss, A., & Agyeman, J. (2002). Mind the Gap: Why do people act environmentally and what are the  
845 barriers to pro-environmental behavior? *Environmental Education Research*, *8*(3), 239–260.  
846 doi:10.1080/13504620220145401
- 847 Kopatz, M. (2013). Die soziale-kulturelle Transformation. In W. Huncke (Ed.), *Wege in die Nachhaltigkeit: die*  
848 *Rolle von Medien, Politik und Wirtschaft bei der Gestaltung unserer Zukunft* (pp. 155–191).  
849 Wiesbaden: Hessische Landeszentrale für politische Bildung.  
850 <http://epub.wupperinst.org/frontdoor/index/index/docId/4670>. Accessed 24 April 2014
- 851 Krüger, T., Richter, S., & Strotz, P. (2010). Immobilieneigentümer in der Stadtentwicklung. *RaumPlanung*, *152*,  
852 11–15.
- 853 Lamnek, S., & Krell, C. (2010). *Qualitative Sozialforschung: Lehrbuch* (5., überarbeitete Auflage.). Weinheim:  
854 Beltz.
- 855 LEG. (2016). *LEG-Wohnungsmarktreport NRW 2016. Mit Wohnkostenatlas*. Düsseldorf: LEG Management  
856 GmbH. <https://www.empirica-systeme.de/2016/08/26/leg-wohnungsmarktreport-nrw-2016/>. Accessed  
857 15 October 2016
- 858 Lind, H. B., Nordfjærn, T., Jørgensen, S. H., & Rundmo, T. (2015). The value-belief-norm theory, personal  
859 norms and sustainable travel mode choice in urban areas. *Journal of Environmental Psychology*, *44*,  
860 119–125. doi:10.1016/j.jenvp.2015.06.001
- 861 López-Mosquera, N., & Sánchez, M. (2012). Theory of Planned Behavior and the Value-Belief-Norm Theory  
862 explaining willingness to pay for a suburban park. *Journal of Environmental Management*, *113*, 251–  
863 262. doi:10.1016/j.jenvman.2012.08.029
- 864 Lowe, R. (2009). Policy and strategy challenges for climate change and building stocks. *Building Research &*  
865 *Information*, *37*(2), 206–212. doi:10.1080/09613210902727960
- 866 Malotki, C. von. (2012). *Die Berücksichtigung der energetischen Gebäudequalität bei der Festlegung von*  
867 *Angemessenheitsgrenzen für die Kosten der Unterkunft und Heizung nach dem Sozialgesetzbuch*.  
868 Darmstadt: Institut Wohnen und Umwelt (IWU).  
869 [http://www.iwu.de/fileadmin/user\\_upload/dateien/wohnen/2012/120727\\_Gutachten\\_Dresden\\_Energie\\_](http://www.iwu.de/fileadmin/user_upload/dateien/wohnen/2012/120727_Gutachten_Dresden_Energie_Ver%C3%B6ffentlichung.pdf)  
870 [Ver%C3%B6ffentlichung.pdf](http://www.iwu.de/fileadmin/user_upload/dateien/wohnen/2012/120727_Gutachten_Dresden_Energie_Ver%C3%B6ffentlichung.pdf). Accessed 24 October 2016
- 871 März, S., Bierwirth, A., & Hauptstock, D. (2013). Rethink the target : drivers, barriers and path dependencies for  
872 a low-carbon-transition in shrinking cities ; the case of Oberhausen. In T. Lindström (Ed.), *Rethink,*  
873 *renew, restart : ECEEE 2013 summer study ; 3-8 June 2013, Belambra Les Criques, Toulon/Hyères,*  
874 *France ; proceedings* (pp. 783 – 793). Stockholm: Europ. Council for an Energy Efficient Economy.
- 875 Mayring, P. (2010). *Qualitative Inhaltsanalyse: Grundlagen und Techniken* (11., aktualisierte und überarb.  
876 Aufl.). Weinheim: Beltz.
- 877 Metzmaker, M. (2015). *Kooperation im Quartier zur Wertsicherung innerstädtischer Immobilien (KIQ): ein*  
878 *Projekt des Forschungsprogramms "Experimenteller Wohnungs- und Städtebau (ExWoSt)" des*  
879 *Bundesministeriums für Verkehr, Bau und Stadtentwicklung (BMVBS) betreut vom Bundesinstitut für*  
880 *Bau-, Stadt- und Raumforschung (BBSR) im Bundesamt für Bauwesen und Raumordnung (BBR) (Stand*  
881 *März 2015.)*. Bonn: BBSR.
- 882 Michelsen, C. (2016). Wärmemonitor 2015: Mit der Erfahrung kommt der Sanierungserfolg. *DIW*  
883 *Wochenbericht*, *29*, 880–891.
- 884 Michelsen, C., Rosenschon, S., & Schulz, C. (2015). Small might be beautiful, but bigger performs better: Scale  
885 economies in "green" refurbishments of apartment housing. *Energy Economics*, *50*, 240–250.  
886 doi:10.1016/j.eneco.2015.05.012
- 887 Neitzel, M. (2011). *Wege aus dem Vermieter-Mieter-Dilemma. Konzeptstudie*. Bochum: InWIS Forschung &  
888 Beratun GmbH. <http://web.gdw.de/uploads/pdf/InWIS-Vermieter-Mieter-Dilemma.pdf>. Accessed 14  
889 October 2015
- 890 Obergassel, W., Arens, C., Hermwille, L., Kreibich, N., Mersmann, F., Ott, H. E., & Wang-Helmreich, H.  
891 (2015). Phoenix from the ashes : an analysis of the Paris Agreement to the United Nations Framework  
892 Convention on Climate Change ; part 1. <https://epub.wupperinst.org/frontdoor/index/index/docId/6373>.  
893 Accessed 14 October 2016
- 894 Pachauri, R. K., & Mayer, L. (Eds.). (2015). *Climate change 2014: synthesis report*. Geneva, Switzerland:  
895 Intergovernmental Panel on Climate Change.



896 Pagel, C. (2012). Höchste Verschuldung in Deutschland: Oberhausen – die Stadt, die von innen stirbt - Die Wahl  
897 in Nordrhein-Westfalen. *FOCUS Online*. [http://www.focus.de/politik/deutschland/nrw-wahl/hoechste-](http://www.focus.de/politik/deutschland/nrw-wahl/hoechste-verschuldung-in-deutschland-oberhausen-die-stadt-die-von-innen-stirbt_aid_749397.html)  
898 [verschuldung-in-deutschland-oberhausen-die-stadt-die-von-innen-stirbt\\_aid\\_749397.html](http://www.focus.de/politik/deutschland/nrw-wahl/hoechste-verschuldung-in-deutschland-oberhausen-die-stadt-die-von-innen-stirbt_aid_749397.html). Accessed 20  
899 December 2012

900 Patton, M. Q. (1990). *Qualitative Evaluation and Research Methods* (Second Edition edition.). Newbury Park,  
901 Calif: SAGE Publications, Inc.

902 Renz, I., & Hacke, U. (2016). *Einflussfaktoren auf die Sanierung im deutschen Wohngebäudebestand.*  
903 *Ergebnisse einer qualitativen Studie zu Sanierungsanreizen und -hemmnissen privater und*  
904 *institutioneller Eigentümer*. Darmstadt: Institut Wohnen und Umwelt (IWU).

905 Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S., Lambin, E. F., et al. (2009). A safe operating  
906 space for humanity. *Nature*, *461*(7263), 472–475. doi:10.1038/461472a

907 Rogers, E. M. (2003). *Diffusion of Innovations* (5th ed.). New York: Free Press.

908 Rogers, E. M. (2004). A prospective and retrospective look at the diffusion model. *Journal of Health*  
909 *Communication*, *9 Suppl 1*, 13–19. doi:10.1080/10810730490271449

910 Rosenow, J. (2012). The politics of the German CO<sub>2</sub>-Building Rehabilitation Programme. *Energy Efficiency*,  
911 *6*(2), 219–238. doi:10.1007/s12053-012-9181-7

912 Rosenow, J., & Galvin, R. (2013). Evaluating the evaluations: Evidence from energy efficiency programmes in  
913 Germany and the UK. *Energy and Buildings*, *62*, 450–458. doi:10.1016/j.enbuild.2013.03.021

914 Scanlan, K., & Kochan, B. (2011). *Towards a sustainable private rented sector*. London: The London School of  
915 Economics and Political Science.  
916 [http://eprints.lse.ac.uk/56070/1/Towards\\_a\\_sustainable\\_private\\_rented\\_sector.pdf](http://eprints.lse.ac.uk/56070/1/Towards_a_sustainable_private_rented_sector.pdf). Accessed 16  
917 October 2016

918 Schätzl, L., Oertel, H., Banse, J., Kilisch, W., Jentsch, S., Glatter, J., et al. (2007). *Investitionsprozesse im*  
919 *Wohnungsbestand - unter besonderer Berücksichtigung privater Vermieter*. Bonn: Selbstverl. des  
920 Bundesamtes für Bauwesen und Raumordnung.

921 Schüring, A. (2014). *German Strategy for Energy-Efficient-Buildings & CO<sub>2</sub>-Rehabilitation Programme*.  
922 [http://www.gbpn.org/sites/default/files/4.%20Andreas%20Germany\\_GBPNwebinar%5B1%5D.pdf](http://www.gbpn.org/sites/default/files/4.%20Andreas%20Germany_GBPNwebinar%5B1%5D.pdf).  
923 Accessed 14 October 2016

924 Schwartz, S. H. (1977). Normative Influences on Altruism. *Advances in Experimental Social Psychology*, *10*,  
925 221-279.

926 Schwartz, S. H., & Bilsky, W. (1987). Toward a universal psychological structure of human values. *Journal of*  
927 *Personality and Social Psychology*, *53*(3), 550–562. doi:10.1037/0022-3514.53.3.550

928 Stern, stern. (2000). New Environmental Theories: Toward a Coherent Theory of Environmentally Significant  
929 Behavior. *Journal of Social Issues*, *56*(3), 407–424. doi:10.1111/0022-4537.00175

930 Stern, P., Aronson, E., Darley, J. M., Hill, D. H., Hirst, E., Kempton, W., & Wilbanks, T. J. (1986). The  
931 Effectiveness of Incentives for Residential Energy Conservation. *Evaluation Review*, *10*(2), 147–176.  
932 doi:10.1177/0193841X8601000201

933 Stern, P., Dietz, T., Abel, T., Guagnano, G., & Kalof, L. (1999). A Value-Belief-Norm Theory of Support for  
934 Social Movements: The Case of Environmentalism. *Human Ecology Review*, 81–97.

935 Stieß, I., & Dunkelberg, E. (2013). Objectives, barriers and occasions for energy efficient refurbishment by  
936 private homeowners. *Journal of Cleaner Production*, *48*, 250–259. doi:10.1016/j.jclepro.2012.09.041

937 Strauss, A. L. (1991). *Grundlagen qualitativer Sozialforschung: Datenanalyse und Theoriebildung in der*  
938 *empirischen soziologischen Forschung*. München: Fink.

939 Thomas, S., Aydin, V., Kiyar, D., Tholen, L., & Venjakob, M. (2013). Strategic policy packages to deliver  
940 energy efficiency in buildings : their international evidence, *Rethink, renew, restart: ECEEE 2013*  
941 *summer study*, 1399–1410.

942 Tversky, A., & Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and Biases. *Science*, *185*(4157),  
943 1124–1131. doi:10.1126/science.185.4157.1124

944 van der Werff, E., & Steg, L. (2016). The psychology of participation and interest in smart energy systems:  
945 Comparing the value-belief-norm theory and the value-identity-personal norm model. *Energy Research*  
946 *& Social Science*, *22*, 107–114. doi:10.1016/j.eress.2016.08.022

947 Volkerding, H. J. (2003). *Bewirtschaftungssituation vermieteter Altbaubestände im Eigentum von*  
948 *Privatpersonen in Stadtumbaustädten*. Frankfurt, Oder: s.n.

949 Vollmer, M. (2015). *Der Dreiklang der Eigentüermobilisierung*. Wiesbaden: Springer Fachmedien Wiesbaden.  
950 <http://link.springer.com/10.1007/978-3-658-07412-8>. Accessed 31 March 2015

951 WBGU. (2009). *Kassensturz für den Weltklimavertrag - der Budgetansatz : Sondergutachten 2009*. Berlin:  
952 Wissenschaftlicher Beirat Globale Umweltveränderungen.

953 Weber, R. (2016). *Mehr gleich besser?: Deutschland verfällt dem Dämmwahn*. Bayerischer Rundfunk.  
954 <http://www.br.de/br-fernsehen/sendungen/mehrwert/daemung-hausbau-energiesparen-100.html>.  
955 Accessed 15 May 2017

- 956 Weiss, J., Dunkelberg, E., & Vogelpohl, T. (2012). Improving policy instruments to better tap into homeowner  
957 refurbishment potential: Lessons learned from a case study in Germany. *Energy Policy*, 44, 406–415.  
958 doi:10.1016/j.enpol.2012.02.006
- 959 Wilkinson, S. J., & Goodacre, C. (2002). Promoting energy efficiency in the private rented sector. *Property*  
960 *Management*, 20(1), 49–63.
- 961 Wilson, C., & Dowlatabadi, H. (2007). Models of Decision Making and Residential Energy Use. *Annual Review*  
962 *of Environment and Resources*, 32(1), 169–203. doi:10.1146/annurev.energy.32.053006.141137
- 963 wmr. (2014). *Innovationsnetzwerk Energieeffizienzregion Ruhr. Endbericht (not published)*. Bochum:  
964 Wirtschaftsförderung MetropoleRuhr.
- 965 Ziehm, C. (2010). Vollzugsdefizit im Bereich des Klimaschutzrechts. *Zeitschrift für Umweltrecht*, (3), 411–418.  
966