Market-Insight 2022

Survey · Sustainability in Residential Real Estate

ENGEL & VÖLKERS
DEVELOPMENT SERVICES

Table of Contents

Introduction

The real estate sector causes about 40 percent of greenhouse gas emissions in Germany. Approximately 25 percent of this amount is accounted for by construction and about 75 percent by utilization and operation.[1] It is therefore not surprising that the demands for more sustainability in the industry are becoming louder and louder, both at the political level and among consumers.

On average, German consumers are willing to pay 18 percent more for sustainable products.[2] However, this additional willingness to pay (WTP) varies for different goods.[3] The "Global Sustainability Study 2021" indicates that the sustainability premium for the construction and use of residential real estate is 25 percent worldwide.[4] However, how much are buyers in Germany willing to spend on the sustainability of a newly built condominium?

Sustainable living is the preferred housing concept of the future. Customers are particularly focused on the energy efficiency of their homes.[5] Although the overall demand for condominiums is falling due to the current market situation (inflation, interest rate development, energy crisis), there has been a significant increase in demand for residential properties with renewable energy sources (+21 percent year-on-year).[6] This trend can be observed despite rising asking prices. In Berlin for example, positive development in prices for new condominiums with alternative energy sources can be observed. In the third quarter of 2022, for the first time prices for newly built dwellings with sustainable energy sources were on average more expensive than those with fossil fuels.[7]

Sustainable housing is associated with higher construction costs. In the past, developers often wondered to what extent customers would accept additional costs for various aspects of sustainability. In order to provide an in-depth answer to this question, we conducted a survey on the topic and interviewed the Engel & Völkers community. On the following pages we provide an insight into the willingness of customers to pay for different sustainability aspects in real estate. In particular, we address the factors renewable energy sources, sustainable building materials and computer aided facility management (CAFM). Full details of the data and methodology can be found on pages 6 and following.

In the current market environment we are already observing indications that customers willingness to buy is strongly influenced by the age of the building and the potential investments required in the future. The study suggests that we are only at the beginning of this trend and that luxury will be defined more by the sustainability of real properties in the future. In order to appeal to a large target group, there should be a focus on these issues. The associated additional costs can be passed on to customers.

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[1] See Bundesinstitut für Bau-, Stadt- und Raumforschung, 2020.
[2] See Simon Kucher & Partners, 2021.
[3] See Biswas/Roy, 2016.
[4] See Simon Kucher & Partners, 2021.
[5] See Greuter/Bangert, 2021.
[6] See McMakler, 2022.
[7] See Value-Marktdatenbank, 2022.

Insights into Customer Preferences

85.1 %	70.8 %	54.2 %	39.8 %	8,667 EUR/m²
WTP > 0 for sustainability aspects	WTP > 0 for sustainable energy sources	WTP > 0 for sustainable construction materials	WTP > 0 for CAFM software	Prices new building Berlin + 13 % (over Q3 2021)

Source: Survey E&V Projekte Berlin GmbH; Value-Marktdatenbank; (WTP = Willingness to pay); WTP > 0 = There is a positive willingness of the customers to pay.

In an open survey we polled around 200 people on the topic of sustainability in real estate between May and August 2022. The results show that the topic has become increasingly important for the decision to purchase a residential property. 85 percent of those surveyed are prepared to pay premiums for the sustainable aspects queried. In particular, additional costs for dwellings with renewable energy sources are accepted by over 70 percent of respondents. Well over half of the participants said they would pay a premium for sustainable construction materials. Almost 40 percent indicated an additional WTP for CAFM systems.

Among our respondents there is no clear preference for climate-neutral new buildings or energy-efficient renovation of existing buildings.

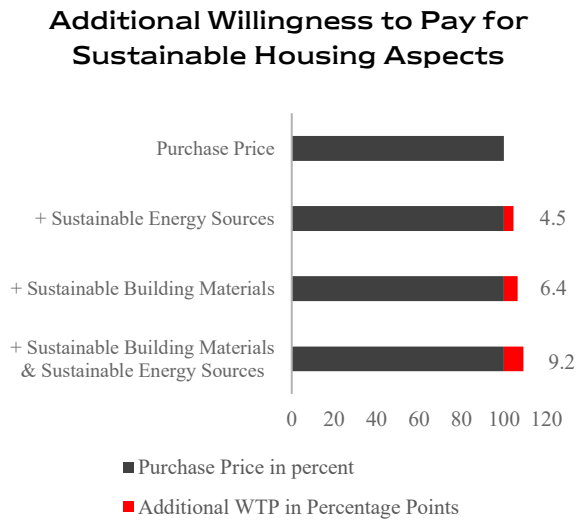

Figure 1: Change of the Mean Additional WTP for Sustainability Aspects (Own illustration)

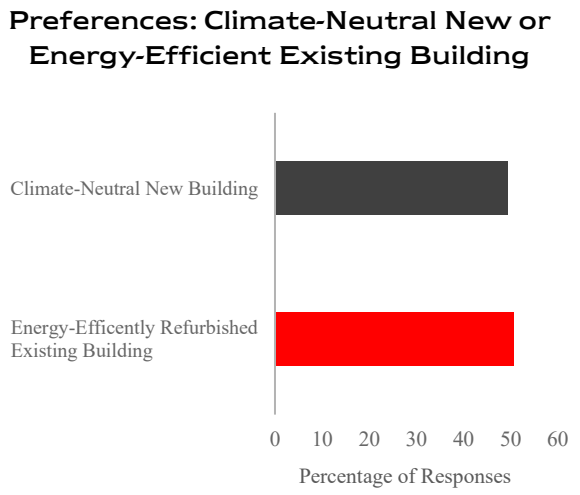

Figure 2: Respondents Preferences for Energy-Efficient Refurbishment of Existing Buildings or Climate-Neutral New Construction (Own illustration)

The average level of additional WTP is around 13 percent of the purchase price. Figure 3 shows the distribution of the variable graphically. However, some significant outliers can be identified and thus the use of the median is recommended. It amounts to 10 percent.

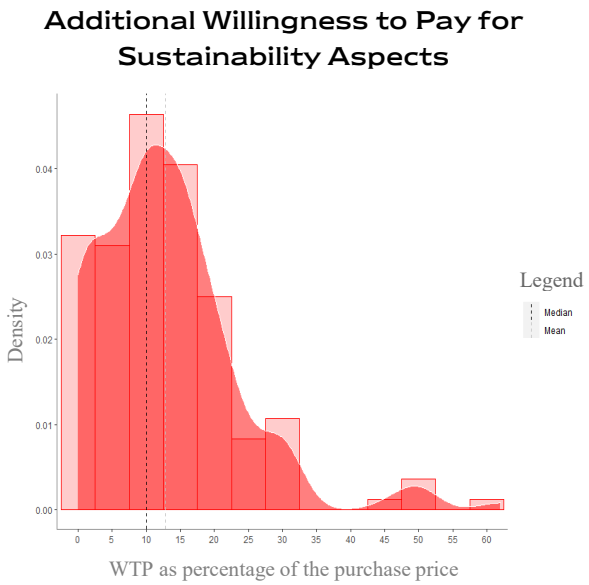

Figure 3: Density Distribution of Additional WTP for Sustainable Aspects (Own illustration)

We were able to prove that the aspects of sustainable materials and sustainable energy sources have a statistically significant and positive influence on the amount of additional WTP reported by customers.

Although significantly fewer people (54 percent) are willing to accept additional costs for sustainable construction materials than for sustainable energy sources (71 percent), the level of the additional WTP is significantly higher for the *materials* variable. The isolated effect - i.e. the change in the mean value of the dependent variable due to the different values of an explanatory variable with all other independent variables held constant - for building materials can be determined to be around 6.4 percentage points. Figure 4 illustrates the significant shift in the mean value.

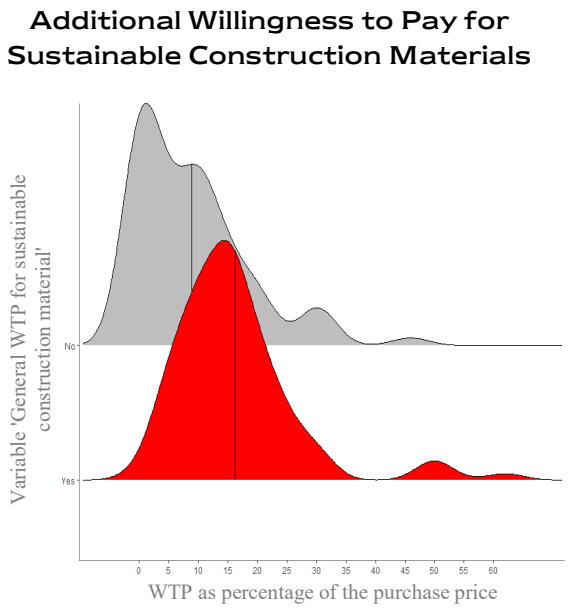

Figure 4: Distribution of Additional WTP for Sustainable Building Materials. (Own illustration)

The likelihood that a customer will show an additional willingness to pay – regardless of the amount – for sustainable building materials increases with the level of income. In other words, the higher the income, the more likely that a customer will be willing to spend additional funds on sustainable material aspects. However, this effect is only significant for net annual incomes exceeding EUR 100,000 per household.

Despite the fact that approximately 71 percent of participants indicated that they would incur additional costs for sustainable energy sources when purchasing a housing unit, the isolated effect of the variable is at 4.5 percentage points and thus lower compared to the effect of sustainable building materials. The gap can presumably be explained by the difference in cost expectations. Figure 5 shows the distribution of the responses and the significant change in the mean value when the aspect of sustainable energy sources is selected.

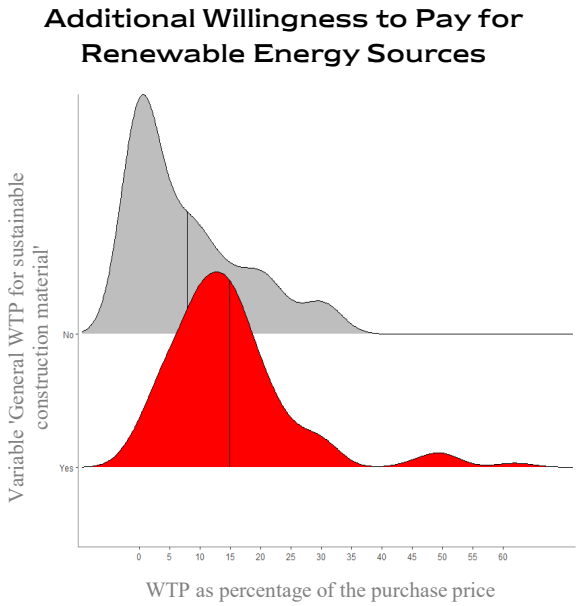

Figure 5: Distribution of Additional WTP for Sustainable Energy Sources. (Own illustration)

Considering the results presented above, an overall additional WTP of around 9.2 percentage points can be assumed for a property built with sustainable construction materials and renewable energy sources.

In addition to the WTP for sustainable materials and renewable energy resources, we explored whether respondents would be willing to pay for CAFM software. About a quarter of the participants chose this option. However, based on our survey results, no statistically significant impact on the level of additional WTP can be found. Nevertheless, it cannot be ruled out that this effect can be identified with a larger and more heterogeneous group of participants. However, we were able to show that the likelihood of a person indicating a WTP for energy-optimizing software is significantly higher among people living in Berlin.

People with children in particular are willing to spend more on a sustainable residential property. Compared to people without children the WTP is 2.8 percentage points higher, which reflects a stronger future- and environment-oriented mindset. Figure 6 shows the shift of the mean value for the different expressions of the variable *children*.

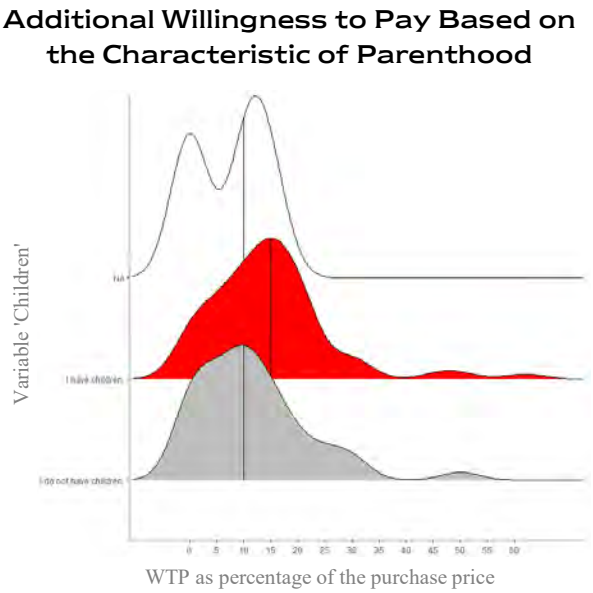

Figure 6: Distribution of Additional WTP Based on the Characteristics of Parenthood (Own illustration)

Conclusion and Outlook

Sustainability, and in particular the use of renewable energy sources, is more relevant than ever. The results of the survey carried out prove that customers are willing to pay for sustainable construction materials and renewable energy sources in their dwellings.

Since bottlenecks in the energy sector already existed at the time of data collection (May through mid-August 2022) and the media covered the issue, it can be assumed that the ongoing energy crisis has already affected the results.

The real estate industry is at a turning point. For the first time, newly built condominiums in Berlin using alternative energy sources are on average more expensive than those using fossil fuels.

Demand for condominiums with renewable energy sources also appears to be stable despite the current market situation and has even increased significantly compared to the previous year. The potential for savings through independence from fossil fuels, which has become apparent as a result of the crisis, appears the likely reason for this development. Hence, we are experiencing a shift in demand that the real estate sector will have to deal with. Upcoming ESG guidelines will also highlight the difference between energy-efficient and -inefficient properties. The good news is that customers are embracing this change.

As a thank you to the numerous respondents to the survey, we decided to make a lasting contribution. For every completed questionnaire, we will have a tree planted. In total, 189 trees will be planted. Sustainability is not only an important topic for our customers, but also our personal concern.

Description of the Dataset

N = 189 persons who participated in the survey. 21 responses had to be excluded due to inconsistencies, i.e. 168 completed questionnaires could be analyzed.

The questionnaire was distributed via the E&V network, as well as social media channels, i.e. *Instagram*, *Facebook* and *LinkedIn*. Given the channels used, it is not surprising that about 45 percent of participants said they work in real estate. 74 participants (44 percent) hold a masters degree or equivalent, 13 percent a bachelors degree, and five percent a Ph.D. or M.D. degree. More than a quarter report vocational training as their highest educational achievement and a further five percent obtained a general university entrance qualification or high school diploma. Ten people chose not to answer the question.

The income ranges were distributed as follows: In each case, around a quarter of respondents reported a net household income of under EUR 40,000, EUR 40,000 to EUR 70,000 or EUR 70,000 - 100,000 per year. 13 percent of the participants stated that they earned between EUR 100,000 and 200,000, six percent even more. 22 people did not disclose their income.

32 percent of respondents were under 30 years old, and the same number were in the 30 to 45 age group. Around a quarter were aged 46 to 60, and nine percent were older. About half of the participants had children, and about the same percentage stated that, they lived in Berlin.

Methodology

The survey consisted of nine questions and was conducted using the *SparrowSurvey* tool. As an incentive to participate, Engel & Völkers commissioned *GrowMyTree* to plant one tree for every completed questionnaire.

Firstly, it was asked whether and, if yes, for which of the three sustainable aspects *energy sources, building materials,* and/or *CAFM software* the participants would be willing to accept additional costs. Another response option was that respondents were not interested in new construction housing at all. Secondly, respondents could select what percentage of any purchase price they would spend additionally.

If participants indicated no additional WTP for sustainable housing in *question 1* and selected a percentage greater than zero in *question 2*, the entire observation was excluded from the analysis due to inconsistency.

Question 3 surveyed preferences regarding climate-neutral newly built or energy-efficient refurbished existing buildings. Starting with *question 4*, the personal characteristics: *age*, *income*, *education*, *place of residence*, and *parenthood* were identified. In order to detect a possible bias of the results we asked whether the participants worked in the real estate industry. This characteristic did not show any significant influence in any of the regression analyses.

We conducted the analysis of the data using the *R* software. The multiple linear regression was carried out using the *lm* function of the *tidyverse* package.

The initial model used to explain the *WTP* dependent continuous variable included the following independent

variables: *sustainable construction materials, renewable energy sources, CAFM software, age, income, educational attainment, place of residence, children,* and *job in the real estate industry.* To determine the mean WTP for dwellings that have both sustainable building materials and renewable energy sources, the binary variable *Energy & Material* was created and added to the model.

The model was optimized using the adjusted R^2 value to improve its predictive power. In our analysis the dependent variable is best explained by the following variables: *sustainable construction materials*, *renewable energy sources, Energy & Material, children,* and *education*. Table 1 summarizes the significant results.

Moreover, we examined whether the probability of choosing the factors could be predicted using the various variables. For this purpose, we used the *glm* function of the *dplyr* package. The probability that a person was willing to spend more on sustainable building materials increased significantly above an income of EUR 100,000. (Confidence interval = 90 percent) and above EUR 200,000, the confidence interval was at 95 percent.

The likelihood of a person indicating a WTP for CAFM software decreased if they lived outside of Berlin. The confidence interval for this result was at 95 percent.

Multiple Linear Regression Analysis: Significant Results

Independent Variable	Coefficient	Standard Error	t Value	Confidence interval
Sustainable construction materials	6.40080	1.78396	3.588	> 99 percent
Renewable energy sources	4.50280	1.96835	2.288	95 percent
I have children.	2.76556	1.62298	1.704	90 percent
Sustainable construction materials & energy sources	9,1961	2,0405	4,507	> 99 percent

Table 1: Overview of Significant Results of the Multiple Linear Regression Analysis of the Dependent Variable WTP (Own representation)

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List of Figures and Tables

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