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»»» KfW Energy Transition Barometer 2023 Energy transition caught between need for action and financial possibilities

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Contents

Executive summary	1
1. Introduction	3
2. Energy prices and cost burdens on households	5
2.1 Consumer prices for energy continue to be above pre-crisis level	5
2.2 Households are experiencing a high cost burden particularly from fossil fuels	6
2.3 Households expect prices to continue rising and are changing their behaviour	7
3. Attitudes towards the energy transition	9
3.1 Households strongly support the energy transition	9
3.2 More households perceive the energy transition as fair	10
3.3 Households are more willing to play a role in the energy transition	11
4. Energy transition activities of private households	13
4.1 More and more households are using energy transition technologies	13
4.2 Strong increases in photovoltaic and battery storage systems	15
4.3 Combining energy transition technologies continues to hold much potential	16
5. Barriers to energy upgrades	19
5.1 High support for energy transition translates only partly into activity	19
5.2 Financial constraints are the main barrier to an energy upgrade	20
5.3 Skilled trades are a central pillar of the energy transition	21
6. Action by private landlords in the energy transition	23
6.1 Private landlords are an important cornerstone of the energy transition for private households	23
6.2 Majority of private landlords see a need for upgrades today or in the future	24
6.3 Financial constraints are the reason most frequently mentioned by landlords for not upgrading	24
7. Conclusion and outlook	27
Bibliography	29

Figures

Figure 1:	Germany is becoming increasingly hotter	3
Figure 2:	Household carbon emissions	4
Figure 3:	Energy price trend shows mixed picture	5
Figure 4:	The better the insulation, the lower the energy costs	5
Figure 5:	Poorly insulated buildings are more likely to be heated with fossil fuels	6
Figure 6:	A good 60% of households are experiencing high cost pressure from heating and electricity	7
Figure 7:	Use of fossil fuels poses a particularly high cost burden	7
Figure 8:	Households with fossil fuels are more likely to reduce their consumption	8
Figure 9:	Strong support for the energy transition	9
Figure 10:	Regional differences in support for the energy transition	9
Figure 11:	The energy transition has grown in relevance for around half of households	10
Figure 12:	More households believe in a fair equalisation of burdens in the energy transition	10
Figure 13:	Share of households with a high willingness to take action rose significantly	11
Figure 14:	Number of users of energy transition technologies is growing noticeably	13
Figure 15:	Energy transition is advancing across all regions and groups of society	14
Figure 16:	Heat pumps in second place, PV and home battery systems expected to record highest growth rates	16
Figure 17:	Owner-occupiers are more likely to use more than one energy transition technology	16
Figure 18:	Further usage potential for combining energy transition technologies	17
Figure 19:	High support for energy transition translates only partly into activity	19
Figure 20:	Nearly half of households engaged with the topic of energy efficiency	19
Figure 21:	Most property owners can imagine undertaking energy upgrades	20
Figure 22:	Financial constraints are the main barrier to an energy upgrade	20
Figure 23:	Tradespeople are in short supply for many technologies	21
Figure 24:	Tenants are less likely to be energy transition stakeholders	23
Figure 25:	Most tenanted households have private landlords	23
Figure 26:	Nearly two thirds of landlords see a need for upgrades now or in the future	24

Figure 27:	Landlords who see a need for action are more likely to plan an energy upgrade	24
Figure 28:	Barriers and impediments to upgrading home energy performance	25

Executive summary

Climate change is impacting on more and more people in Germany. At the same time, developments in the past two years have highlighted how risky it is to rely on a single source of fossil fuels for energy. The key to achieving both climate neutrality and energy supply security – with a view to economic as well as personal activities – is to reduce energy consumption and use zero-emission technologies.

Against this backdrop, the findings of the representative KfW Energy Transition Barometer 2023 are encouraging as they demonstrate not just that households continue to back the energy transition project even though it comes with higher costs. They also reveal that the use of energy transition technologies has increased further. Almost one third (32%) of all households are currently using technologies such as photovoltaic solar systems or heat pumps. A further 7% plan to acquire such technologies this year. The increase can be seen across almost all groups of society. Existing differences, for example in terms of income, decreased slightly last year.

A majority of 60% of households that do not use energy transition technologies can now imagine using them – an unprecedented rate. Another positive finding is that a significantly higher number of respondents regard the energy transition as fair than in the previous year's survey.

This positive attitude and acceptance must now be upheld – and converted into action. That will make it possible to win further households over for the necessary measures and investments. The most common hurdles are financial barriers, so they must be eliminated in order to increase households' engagement. There is also a need to make energy transition investments continuously more attractive by making technologies more affordable and convincing households that using them brings predictable economic benefits.

Placing even more emphasis on the combination of technologies may also be helpful. Thus, the effectiveness of photovoltaic systems can be improved by storing excess output in a home battery or electric vehicle.

Significant potential remains untapped here, as currently fewer than 20% of photovoltaic solar system owners also use a home battery and only 9% use an electric car.

In addition to financial factors, the skilled trades sector plays an important role in providing advice and designing as well as implementing measures. Nearly one quarter of households (23%) discussed the energy condition of their dwelling with a tradesperson last year. The availability of well-trained skilled tradespeople is crucial to the deployment of energy transition technologies in households and their reliable operation. Skilled trades strategies should therefore also be aligned with the needs of the energy transition. The current support initiatives of the German Federal Government for strengthening capacity building measures for tradespeople, particularly in the area of heat pumps, are pointing in the right direction.

The energy transition is also becoming more important in rented properties. Nearly two thirds of the private landlords surveyed (64%) believe their rented property needs to be upgraded now or within the next 10 years. Financial constraints are also the most frequent barriers to upgrades for both landlords and owner-occupiers, but coordination with other owners and bottlenecks in the construction sector also represent limiting factors.

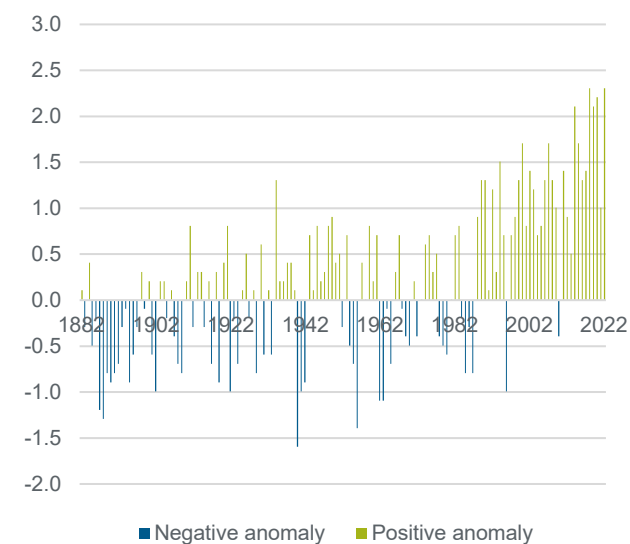
The findings of the KfW Energy Transition Barometer 2023 reveal widespread approval of the energy transition among households, even in times of high energy costs, and they show that many households want to play an active role. This is an important factor because households are responsible for almost 40% of carbon emissions in Germany and their decisions can make a great difference. The prerequisites for a successful transition among households are therefore fulfilled. If the enabling conditions can now be designed in such a way that there are no financial or logistical barriers to thwart households' engagement, they will be able in the future to make a significant contribution to achieving the climate targets and increasing Germany's energy independence.

1. Introduction

In the northern summer of 2023, both the wildfires in Greece and the heatwaves in southern Europe were a powerful reminder that climate change is real. The effects are becoming increasingly more frequent and obvious in Germany as well. Temperatures were above the long-term average in each month of the first half of 2023. Average annual temperatures in Germany were above the long-term average in 24 of the last 25 years (Figure 1).

Figure 1: Germany is becoming increasingly hotter

Annual deviations from the long-term average (1900–1990) in degrees Celsius.



Source: DWD (2023), own rendition.

Climate change is affecting more and more people in Germany.¹ A large part of the business community will also be directly impacted.² And not least, more and more political actors such as local governments are addressing the consequences of climate change on the ground.³ The transition to a climate-neutral economic and business model is therefore crucial if we want to stop the Earth from warming further.

At the same time, this transition is also relevant for energy security because the energy supply situation remains tense. To be sure, import prices for energy have recently dropped sharply again. The situation currently appears to be manageable for many businesses and public bodies.⁴ But the persistent geopolitical uncertainties still highlight how risky it is to rely on a single source of fossil fuels, not least for the competitiveness of the German economy.⁵

We therefore need to make energy consumption as efficient as possible in order to both protect the climate and secure energy supplies. At the same time, we have to push ahead with decarbonising and diversifying energy supplies. The energy transition plays a key role because improving energy efficiency contributes to reducing energy consumption, while expanding renewables helps gain more independence from fossil energy sources.

But time is running out. Containing loss and damage from climate change and limiting energy uncertainty both require decisive action. Policymakers are still arguing over the right energy transition pathway. But one thing is already clear: Households need to play their part if we want to achieve the climate targets.

They account for almost 30% of Germany's overall energy consumption.⁶ Around 85% of this energy is used for household heating and hot water alone.⁷ Households use one third of the natural gas consumed in Germany.⁸ They contribute more than 70% of greenhouse gas emissions in the building sector.⁹ They are also key mobility actors. Around two thirds of greenhouse gas emissions from transport – the sector with the lowest greenhouse gas reduction rates since 1990 – are generated by households.

¹ Cf. Römer and Salzgeber (2022a).

² Cf. Brüggemann and Grewenig (2023).

³ Cf. Brand et al. (2023).

⁴ Cf. for example Schwartz and Grewenig (2023) for SMEs, and Brand et al. (2022) for municipalities.

⁵ Cf. Scheuermeyer (2023).

⁶ Cf. AG Energiebilanzen (2022).

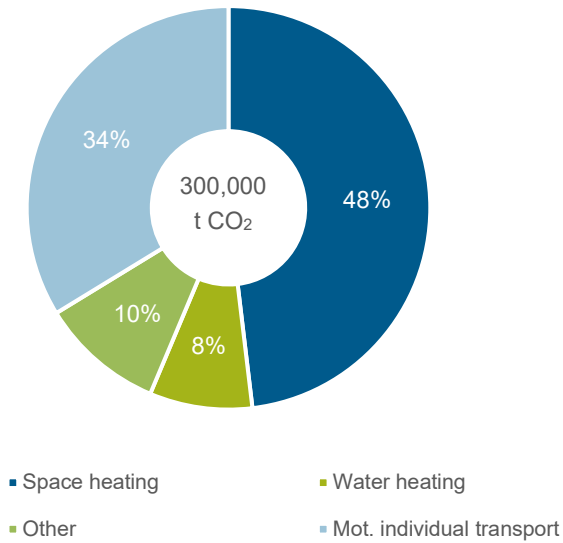
⁷ Cf. Römer and Salzgeber (2022c).

⁸ Cf. AG Energiebilanzen (2023).

⁹ Cf. German Federal Environment Agency (2023).

Figure 2: Household carbon emissions

Carbon emission shares caused by different areas of household energy consumption (direct and indirect emissions, total shown in middle of circle).



Source: Own rendition based on Destatis (2022a).

The key role which households play in the energy transition is also reflected in the carbon emissions generated by household energy consumption. In fact, almost 40% of total annual carbon emissions in Germany, around 300 million tonnes, can be attributed to household activities.¹⁰ Space heating accounts for almost half of these emissions. With water heating and other household electricity consumers (stove-tops, dishwashers, washing machines, refrigerators, other household appliances and lighting), the residential sector makes up around two thirds of household emissions. Motorised individual transport for private purposes is responsible for the remaining one third.

Thus, households can exert crucial influence on emissions and, hence, on achieving Germany's climate targets, for example through their choice of heating technology or vehicle. At the same time, current developments such as rising energy and consumer prices are also creating new and significant challenges for many households.

If Germany is to achieve its climate targets, it must double annual greenhouse gas emission reductions in the building sector alone in order to reach the sector goal for the year 2030. The key to this lies in the expansion of building upgrades and the removal of barriers to relevant activities. Financial aspects are the main constraints preventing households from implementing energy upgrades.¹¹

While increased energy costs are making energy upgrades more attractive, they also limit households' financial scope and therefore can even exacerbate existing financial obstacles. Thus, initial findings indicate that the increased heating costs are not likely to necessarily lead to a higher modernisation rate or growing pressure to upgrade rental properties.¹²

In order for the energy transition to succeed, policy frameworks must be adapted time and again to changing economic and social challenges. Incentives must be balanced appropriately but solutions must also be found for economic and social hardships in times of crises. In order for this realignment of policy frameworks to work efficiently and effectively, there is also a need to develop a deeper understanding for the current challenges and barriers faced by businesses and households.

Therefore, in the following chapters the KfW Energy Transition Barometer 2023, as a Germany-wide representative household survey, provides valuable insights into the effects which current economic conditions and policy frameworks are having on households' support for and activities around the energy transition.

¹⁰ Own calculations based on Destatis (2022a), Destatis (2022b).

¹¹ Cf. Römer and Salzgeber (2022c).

¹² Cf. Römer and Salzgeber (2023a).

2. Energy prices and cost burdens on households

Consumer prices for energy continue to be well above the level of 2021.

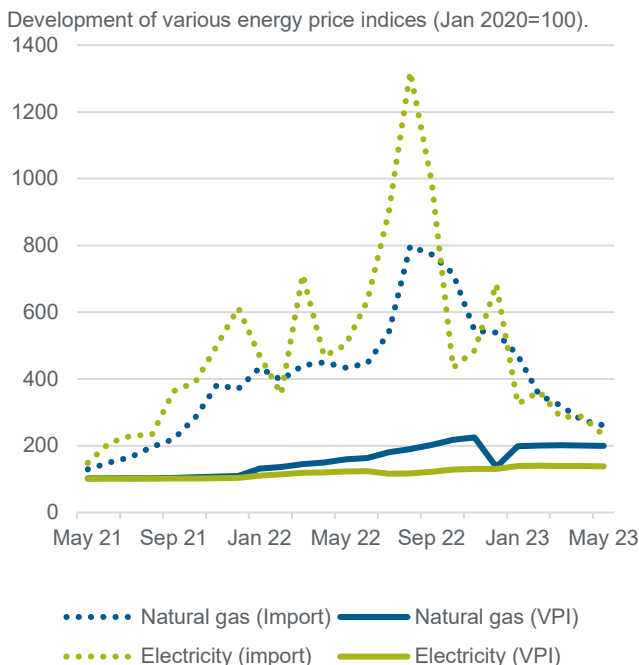
Higher consumer and energy prices place a high cost burden on households.

Space heating with fossil fuels in particular is associated with high cost pressure.

2.1 Consumer prices for energy continue to be above pre-crisis level

The previous year was primarily marked by the effects of Russia's war of aggression on Ukraine and major uncertainties in the energy market. At times, these appeared in the form of extreme price variations, especially for imports. Whereas import prices have been on the decline again since the middle of the past year, average energy costs paid by households in Germany are still rising moderately (Figure 3).¹³ In May 2023, consumer prices for natural gas were almost 100% above the December 2021 level, while electricity prices were around 35% higher.¹⁴

Figure 3: Energy price trend shows mixed picture



Source: Destatis (2023c), own rendition.

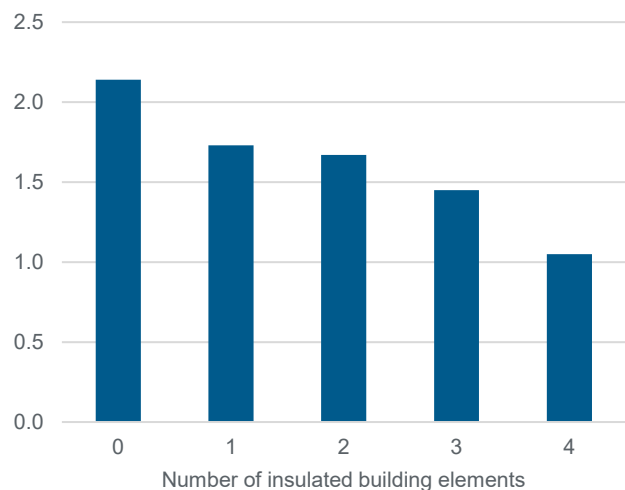
¹³ The delay is mainly due to longer-term contracts concluded with retail customers.

¹⁴ Cf. Destatis (2023a).

The high energy prices coincide with a period of generally much higher costs of living, which significantly restricts the financial scope of many households.¹⁵ The survey findings of the KfW Energy Transition Barometer 2023 also reflect this development. Sixty per cent of households responded that their energy costs rose in the past year. On average, the households surveyed paid around EUR 1.74 per square metre of living space per month in 2023. Households with gas and oil heating systems had above-average costs, while those with heat pumps and wood pellet heaters paid much less. In addition, the cost of heating a home in the bottom income quartile was around EUR 2 per square metre, well above the cost incurred by higher income groups, for example EUR 1.32 in the top income quartile. This is probably due mainly to the fact that lower-income households are more likely to reside in older and less well insulated buildings.¹⁶ Energy costs correlate particularly closely with building insulation (Figure 4).

Figure 4: The better the insulation, the lower the energy costs

Energy costs in euros per square metre by level of building insulation. Only results for owner-occupiers are shown.



Note: The insulation measures referred to comprise the outer walls, basement floor, roof and triple glazing.

Source: KfW Energy Transition Barometer 2023

¹⁵ Cf. Scheuermeyer et al. (2023).

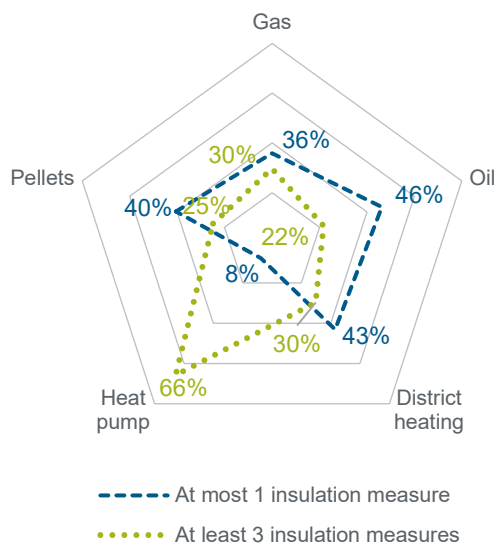
¹⁶ Cf. Römer and Salzgeber (2022c).

Thus, the average cost per square metre for owner-occupiers residing in a completely uninsulated home is around twice as high as for owner-occupiers whose homes have insulated external walls, basement ceilings and roofs and additionally have triple-glazed windows (EUR 2.14 vs. EUR 1.05).¹⁷

The level of insulation correlates closely with the age of the building. Owner-occupied dwellings in which all elements are insulated are on average around 40 years younger than buildings in which only one or no element is insulated. The heating technology used also correlates with the age of the building. Owner-occupied buildings that are heated with natural gas are on average around 30 years older than those inhabited by households that use heat pumps. For oil heating systems it is even more than 35 years.

Figure 5: Poorly insulated buildings are more likely to be heated with fossil fuels

Shares of households in buildings with specific insulation measures by type of heating system; showing only results for owner-occupiers.



Note: The groups refer to buildings in which none or one (blue) or 3 or 4 (green) of the insulation measures exist that are presented in Figure 4. Guide: 66% of households that use a heat pump (HP) for heating reside in buildings in which 3 or 4 insulation measures are in place.

Source: KfW Energy Transition Barometer 2023

Another likely reason for the correlation between insulation and energy cost burden, besides the energy savings it achieves, is the circumstance that older and less well insulated buildings are also more likely to be heated with fossil fuels, which have become particularly expensive (Figure 5). The overlap in Figure 5 of the more climate-friendly heat pump and the fossil fuels natural gas and oil is relatively small, which means that the corresponding buildings differ significantly in their insulation properties depending on the heating system in place.

Thus, the group of poorly insulated buildings (blue line) in households with heat pumps is hardly relevant (8%) and well below the figures for gas (36%), oil (46%), district heating (43%) and wood pellets (40%). On the other hand, a particularly large proportion of households with heat pumps (66%) have the best insulated buildings. By contrast, households that use fossil fuels are significantly less likely to have these levels of insulation (30% for district heating and gas, 22% for oil).

That means the latter households are exposed to rising energy prices via two channels. First, the source of energy has become much more expensive, the price per unit consumed is rising. Second, the relatively poor insulation means that many households are also likely to consume more energy. The price effect thus combines with a higher energy demand. It must be borne in mind here that a large portion of households in Germany continue to heat their homes with fossil fuels. Around 65% of owner-occupiers surveyed under the KfW Energy Transition Barometer primarily heat their homes with oil or gas, approx. 5% with district heat, slightly over 8% with a heat pump and around 9% with wood pellets.¹⁸

2.2 Households are experiencing a high cost burden particularly from fossil fuels

The increased heating costs are a burden on many people in Germany. In the current survey, more than 60% of households reported that heating and powering their homes presented a very high cost burden in 2022 (Figure 6). This is yet another increase on the previous year's survey and illustrates that the higher energy procurement costs are increasingly trickling down to consumers.¹⁹

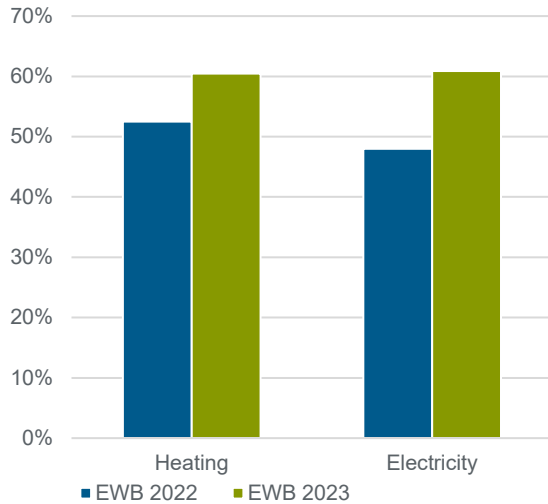
¹⁷ As insulation measures are not always obvious to a tenant, responses provided on insulation were evaluated primarily for owner-occupiers because it can be assumed that they are generally informed about the energy situation of their property.

¹⁸ A look at all the households surveyed shows that 66% heat their homes with gas or oil, 15% with district heat, 5% with a heat pump and 6% with pellets. These figures are largely consistent with Destatis (2023a).

¹⁹ Cf. Römer and Salzgeber (2022b).

Figure 6: A good 60% of households are experiencing high cost pressure from heating and electricity

Share of households reporting high or very high cost pressure from electricity and heating.



Source: KfW Energy Transition Barometer 2022 and 2023

Households in low-income brackets are more likely than average to describe the cost of heating and electricity as a heavy burden, while high-income households are less likely to (71% in the lowest income quartile, 47% in the highest). At the same time, there is no significant difference in the way owner-occupiers and tenants view cost burdens (58 vs. 62%).

The different types of heating systems show that users of fossil fuels in particular complain about high cost burdens. Households with gas and oil heating systems do so more than average. Households with heat pumps and wood pellet heating systems, in turn, are much less likely to (Figure 7). This appears to be a direct result of the sharp rise in the cost of fossil fuels and the differences in levels of insulation discussed above.

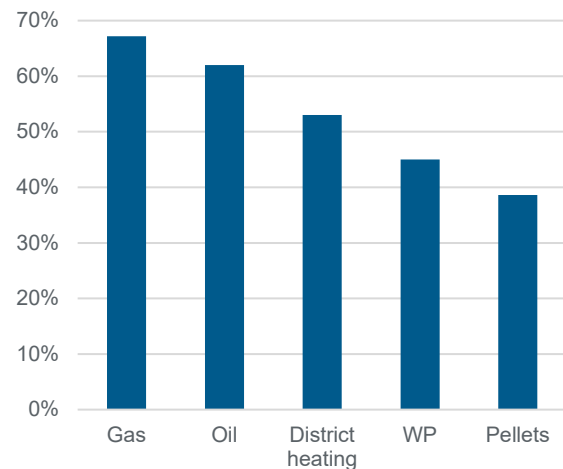
As the cost pressure from heating with gas and oil is particularly high and a large portion of households heat their homes with these fuels, heating places a high cost burden on a very large number of households.²⁰ This likely also explains why there was broad agreement among the population on relief measures such as the gas price brake.²¹

²⁰ Thus, even in buildings erected after 1993, almost 80% of all newly erected dwellings still use mainly oil or gas for heating. Cf. Römer and Salzgeber (2022b).

²¹ Cf. Römer and Salzgeber (2023b).

Figure 7: Use of fossil fuels poses a particularly high cost burden

Share of households reporting a high or very high cost burden from electricity and heating, by type of heating system.



Source: KfW Energy Transition Barometer 2023

2.3 Households expect prices to continue rising and are changing their behaviour

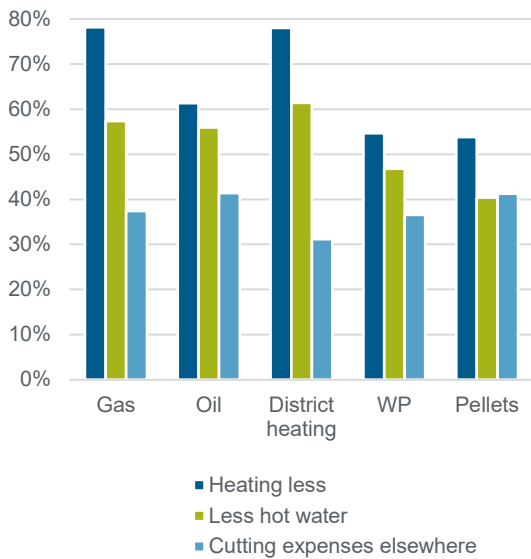
Households expect further cost pressure in the future. Around 70% of households surveyed under the KfW Energy Transition Barometer 2023 expect the cost of heating to rise further, more than 20% of households were already notified accordingly at the time of the survey and nearly 50% expect to be notified.

Households that are already experiencing high cost pressure are disproportionately more likely to expect further cost increases (71 vs. 63% in the group reporting low cost pressure from heating). However, there are no clear differences in expectations between fossil and green energy sources. The majority of households everywhere expect heating costs to rise.

This means that even green technologies cannot decouple from the energy price trend. Consumer prices for electricity required to operate heat pumps, however, have risen less strongly than, for example, natural gas prices (see Figure 3). As a result, users of heat pumps were generally exposed to lower energy price increases than households that use gas for heating.

Figure 8: Households with fossil fuels are more likely to reduce their consumption

Shares of households that reported heating less, using less hot water or cutting expenses elsewhere, by type of heating.



Source: KfW Energy Transition Barometer 2023

Households are planning diverse responses to increased heating costs. Most indicated plans to cut back on heating (70%) and use less hot water (55%). Even so, 36% of households reported saving money elsewhere to be able to pay the higher costs of heating. Adaptation measures tend to be mentioned more often by households that use fossil fuels than by those that use green technologies for heating (Figure 8).

The adaptation measures implemented also correlate with the level of insulation of the buildings. Thus, around 72% of owner-occupiers with the poorest level of insulation reported plans to turn their thermostat down. That figure was around 62% among owner-occupiers with the best level of insulation. Even more striking is the difference among households that want to or have to cut spending elsewhere to pay the cost of heating. This applies to 44% of owner-occupiers with very poor insulation but to only 25% of owner-occupiers with very good insulation.

Among tenants, 13% of households have at least talked to their landlords about upgrading the dwelling's energy performance. Many property owners are also considering energy upgrades. Nearly one third of property owners reported that they were considering this. Around 10% of tenants are even considering moving because of high heating costs, while that figure is around 1% among property owners.

Around 15% of households have not taken any of these measures, 23% have made one and a notable 30% have made at least three of the changes described here. A much higher share of households experiencing high cost pressure made more than one change (68%) than households facing less cost pressure (50%).

3. Attitudes towards the energy transition

Around 90% of households believe the energy transition is important or very important.

Views about the fairness of the energy transition have improved.

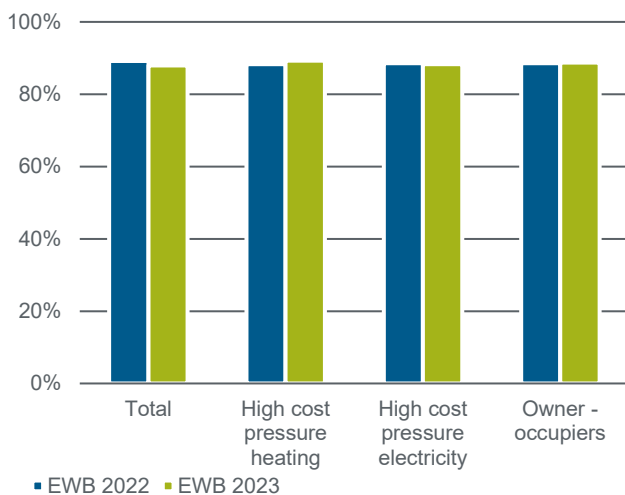
The willingness of households to actively participate in the energy transition is increasing noticeably.

3.1 Households strongly support the energy transition

The many uncertainties and crises of the past months and years have left an imprint on the people in Germany. Risks such as inflation and war, long believed to have been forgotten, have suddenly taken centre stage in our lives, making concerns such as climate change appear less urgent.²² It is therefore positive that households' support for the energy transition under the KfW Energy Transition Barometer 2023 remains persistently high.

Figure 9: Strong support for the energy transition

Share of households surveyed that believe the energy transition is important or very important.



Source: KfW Energy Transition Barometer 2022 and 2023

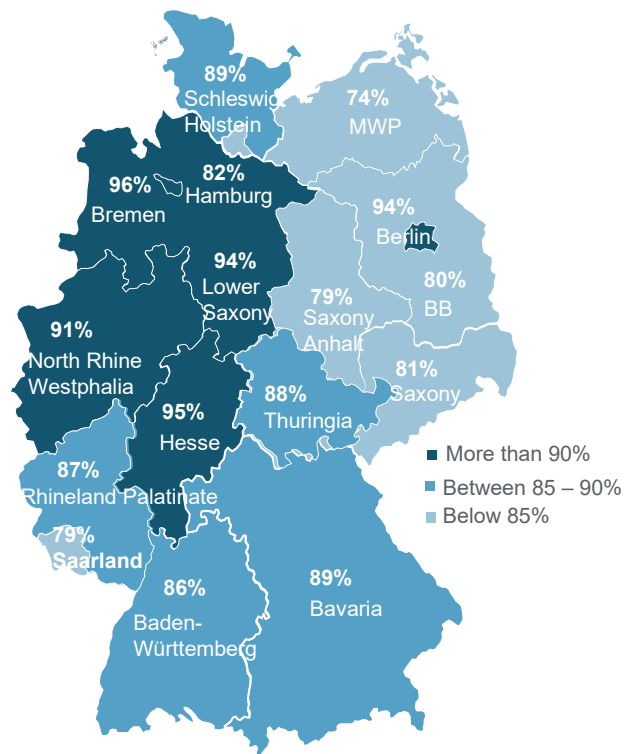
Overall, nearly nine in ten households (88%) believe the energy transition is important or very important. This strong approval applies to households experiencing high cost pressure from electricity and heating and to owner-occupiers (Figure 9). Despite the challenges and uncertainties of the past year, the energy transition thus continues to enjoy strong popular support.

²² Cf. Sicherheitsreport (Security Report) (2023).

The high approval rates can be seen across various socio-demographic groups and regions in Germany. Regionally, the highest approval rates of more than 90% were given in several city-states and Western German states. The lowest approval rates were given in Mecklenburg Western Pomerania, Saxony Anhalt and the Saarland, with less than 80% (Figure 10).

Figure 10: Regional differences in support for the energy transition

Share of households surveyed that believe the energy transition is important or very important by federal state, averaged over the years 2022 and 2023.



Source: KfW Energy Transition Barometer 2022 and 2023

The reasons for these differences may in part lie in the age structure of the population. The large states with relatively low approval rates also have the oldest population. Income effects may also help explain the differences. In some areas of the eastern German states, incomes are significantly below the German average. For lower-income groups in particular, economic aspects often play a more important role than environmental or climate considerations.²³ But

²³ This is also indicated by the findings of a current survey according to which anxiety about climate change ranks eighth among the ten main fears in western Germany. In eastern Germany, however, climate change is not among the top ten. Cf. R+V Versicherungen (2023).

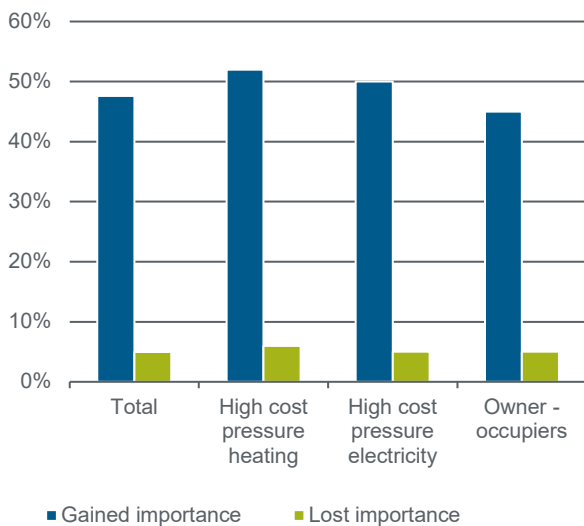
despite all regional differences, the vast majority of households believe the energy transition is important or very important even in states with relatively low approval rates.

The approval rate tends to be higher in large cities than in rural areas (91 vs. 82%). There are no noticeable differences by net household income. The approval rates in the lowest-income group (89%) and in the highest-income group (90%) are nearly the same.

Broad support for the energy transition is also visible across different housing arrangements (between 88 and 91%), age groups (between 82 and 96%) and educational backgrounds (between 85 and 93%).

Figure 11: The energy transition has grown in relevance for around half of households

Share of households surveyed for which the energy transition has become more important or less important.



Source: KfW Energy Transition Barometer 2023

The energy transition gained in importance last year for nearly half of households (Figure 11). The rates are significantly higher than in the previous year's survey (48 vs. 30%). Supportive households that have to shoulder high costs for electricity and heating are represented in a similar share as in the overall population. The uncertainties of the past months thus appear to have even increased the relevance of the energy transition for many households, irrespective of its economic effects.

3.2 More households perceive the energy transition as fair

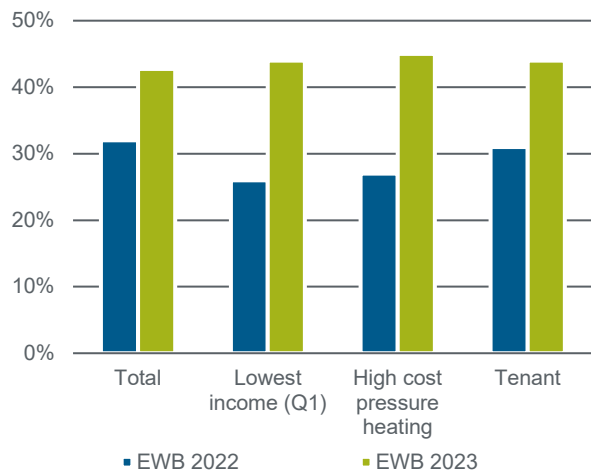
Trust is essential for initiating and maintaining social interactions, it promotes mutual cooperation and facilitates stable relationships.²⁴ Deep trust in policy-makers in general and fairness in the implementation of policies in particular can help to foster cooperative behaviour and, for example, increase public support for environmental policy reform.²⁵ Public trust in policy-makers and fairness of political decisions are therefore also important prerequisites for a successful energy transition.

In the KfW Energy Transition Barometer 2022 households gave the trust placed in information from politicians a mean score of 4.9 on a scale of 1 to 10 (where 1 was very low and 10 was very high). In the current survey the scores were on a similar level (4.6). In Germany the level of trust is above the European average.²⁶

The views regarding the fairness of the energy transition have improved significantly. Around 43% of households currently believe that policymakers are intent on finding a fair solution for all groups of society in the energy transition, after 32% in the previous year (Figure 12).

Figure 12: More households believe in a fair equalisation of burdens in the energy transition

Share of households surveyed that believe in a fair equalisation of burdens in the energy transition



Source: KfW Energy Transition Barometer 2022 and 2023

²⁴ Cf. Campbell et al. (2010).

²⁵ Cf. Muhammad et al. (2021).

²⁶ Germany ranked 13th among the 29 participating EU countries for trust in politicians, cf. European Social Survey 9 (2021).

The more widespread belief in a fair transition is evident across almost all groups, including low-income groups, households experiencing high cost pressure and tenants. The only households that still do not believe the transition is fair were in the group that do not regard it as important.

These findings indicate that the economic policy relief measures introduced by the government last year, such as the gas and electricity price brake, have increased the number of households that believe in a fair transition.

3.3 Households are more willing to play a role in the energy transition

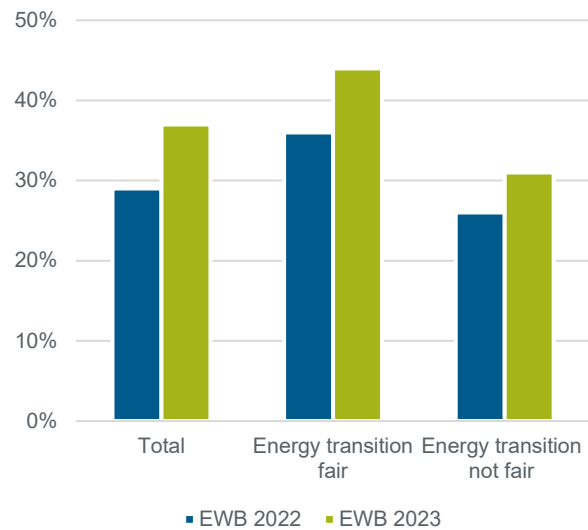
In addition to surveying households' general views of the energy transition, the KfW Energy Transition Barometer also asked about their willingness to take action themselves.

The current survey findings show that they are now slightly more willing to play a part than in the previous year. On a scale from 0 to 10, the households surveyed under the KfW Energy Transition Barometer rated their willingness to accept sacrifices in order to advance the energy transition at 6.4 on average (previous year 6.1). The share of households most willing to accept sacrifices (8–10 on the scale) rose from 29 to 37% (Figure 13).

An increased willingness to take action was reported both by households that believe the energy transition to be fair and by those that do not – although in the latter group there are significantly fewer households that have a strong willingness to take action.

Figure 13: Share of households with a high willingness to take action rose significantly

Share of households surveyed signalling a high willingness to play a role to advance the energy transition (greater than 7 on a scale of 0–10).



Source: KfW Energy Transition Barometer 2022 and 2023

These findings are encouraging because they show that households can generally be won over to embrace the energy transition even if they do not consider it to be important. Financial motives often play a role here, prompting households to choose to modernise their dwellings not out of a sense of conviction but, for example, out of cost-effectiveness considerations.²⁷ Therefore, in addition to high acceptance of the energy transition, targeted investment incentives that shift households' rationale in favour of green technologies can be a key to its success.

²⁷ Römer and Steinbrecher (2021).

4. Energy transition activities of private households

Nearly one third of households use at least one energy transition technology.

Strongest growth rates expected in photovoltaic and battery storage systems.

Significant potential exists for combining diverse energy transition technologies.

4.1 More and more households are using energy transition technologies

Nearly 32% of households in Germany use at least one of the energy transition technologies surveyed under the KfW Energy Transition Barometer 2023 (Figure 14), a noticeable increase of around 3 percentage points.²⁸ Slightly more than 7% plan to acquire an energy transition technology in the coming 12 months, roughly the same percentage as in the previous year.²⁹

The number of households using energy transition technologies is growing across all regions and groups of society in Germany (Figure 15).

Southern Germany continues to have the largest number of households with energy transition technologies (43%) but their share has also grown in all other regions. The same applies to the urban-rural divide. There are significantly more energy transition stakeholders in rural regions than in large cities (49 vs. 18%) but their numbers also increased in mid-sized and large cities last year.

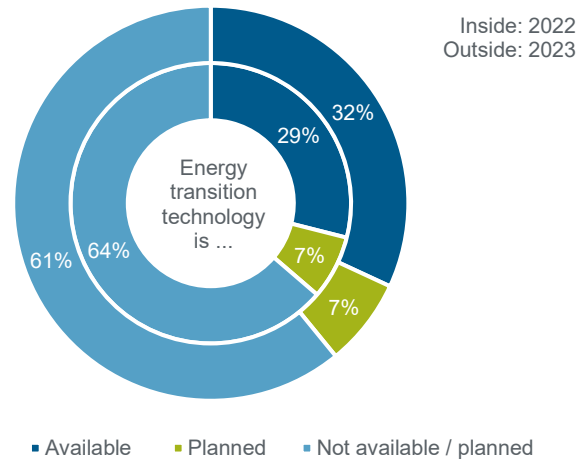
Households that embrace the transition are significantly more common in higher-income than lower-income groups (42% in the fourth quartile vs. 25% in the first quartile). It is therefore particularly encouraging that there was a sharp rise in energy transition stakeholders not only in the highest-income group but also in the group of lowest-income households. However, there is little movement in the middle-income brackets.

²⁸ The energy transition technologies contemplated here are solar thermal energy, photovoltaic solar energy, heat pumps, combined heat and power, battery storage, electric vehicle and wood pellet heating.

²⁹ Any deviations from the values reported in the published KfW Energy Transition Barometer 2022 are based on an improved weighting scheme, which was also applied to values of preceding KfW Energy Transition Barometers in this report. For detailed information see the Volume of tables and methods of the KfW Energy Transition Barometer 2023.

Figure 14: Number of users of energy transition technologies is growing noticeably

Share of households surveyed using at least one energy transition technology.



Note: The energy transition technologies contemplated here are solar thermal energy, photovoltaic solar energy, heat pumps, combined heat and power, battery storage, electric vehicle and wood pellet heating.

Source: KfW Energy Transition Barometer 2022 and 2023

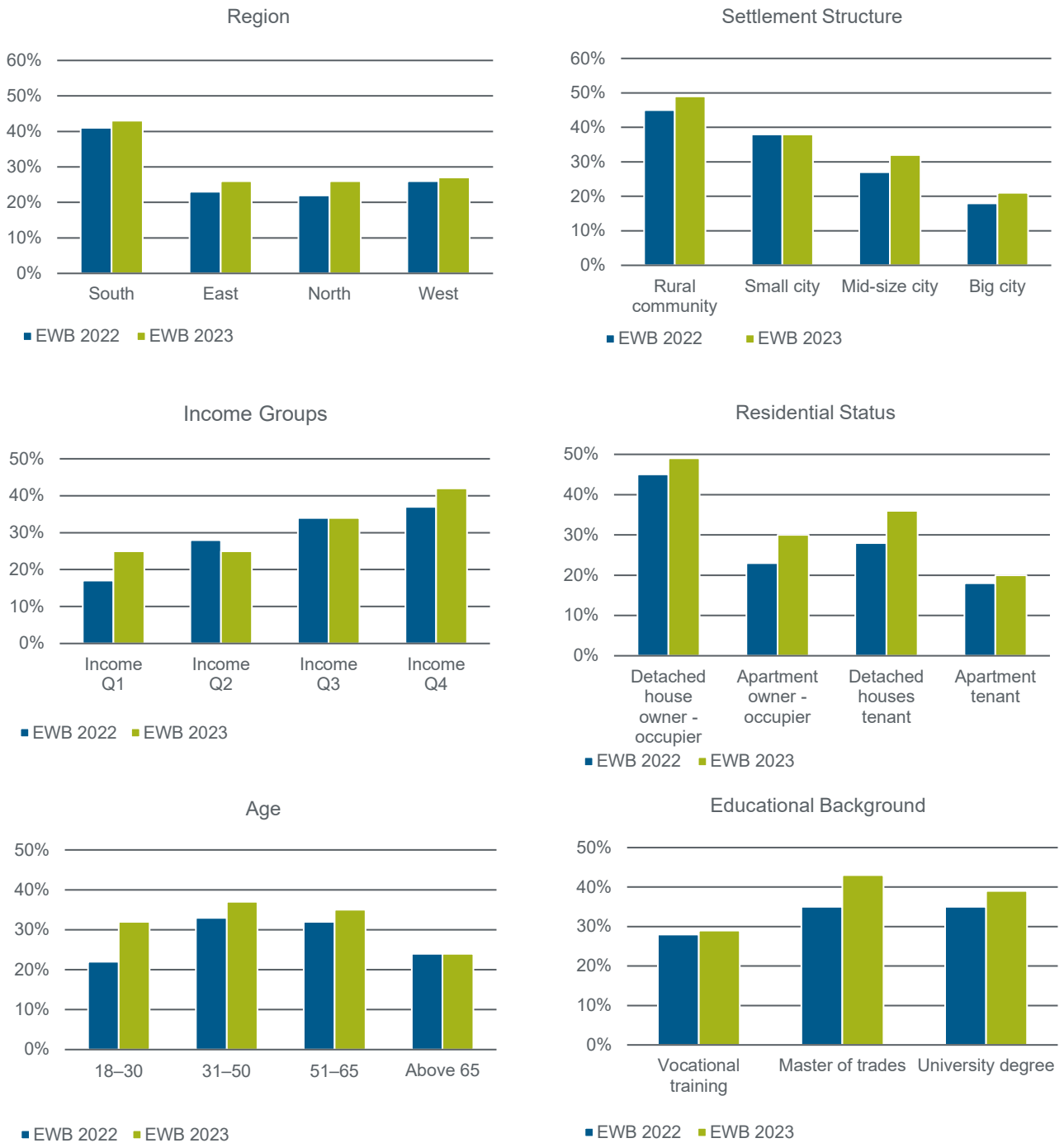
In terms of housing arrangements, detached houses are inhabited much more often by energy transition stakeholders than apartments and owner-occupiers are more likely to be actively supporting the transition than tenants. In all constellations, the number of energy transition stakeholders rose last year, although the margin in rented accommodation was relatively low.

With regard to age, energy transition stakeholders are traditionally most common in the middle age groups between 30 and 65 years – those who have completed their education but are not yet retired. But here, too, the KfW Energy Transition Barometer 2023 shows higher rates of energy transition stakeholders in all age groups than in the previous year. The strongest increase was found in the youngest age group from 18 to 30 years, which has now almost caught up with the middle age groups.

In terms of educational backgrounds, people with higher-level qualifications such as master of trades and university degrees with their generally higher average incomes are more likely to be energy transition stakeholders than those with lower, no or unfinished qualifications. However, there was an increase in energy transition stakeholders in all educational categories presented, even if the increase in the group of vocational and technical education was only minor.

Figure 15: Energy transition is advancing across all regions and groups of society

Share of households using at least one of the energy transition technologies contemplated



Source: KfW Energy Transition Barometer 2022 and 2023

4.2 Strong increases in photovoltaic and battery storage systems

A breakdown of the energy transition technologies used reveals clear differences in their dissemination and development on the previous year. The strongest increase was in photovoltaic solar systems. They are the most commonly used energy transition technology, at 11.7% compared with 9% in the previous year. Among property owners the diffusion is 19.2%, almost twice as high as the average of all households.³⁰ Photovoltaic systems are also the technology with the highest values for planned acquisitions. Just under 7% of all households and 13% of all property owners intend to purchase a PV system in the coming 12 months.

Home batteries experienced further significant growth. Issues around energy security and the possibility to combine them with other electrical energy transition technologies such as PV systems, heat pumps and electric cars are likely to make home batteries increasingly more interesting. It is true that only 3.6% of all households and 6.3% of all property owners currently use the technology but these figures represent growth rates of more than 60% and more than 30% on the previous year's figures of 2.2% and 4.7%. At the same time, the planning figures also indicate that this technology is set for further dynamic growth. Six per cent of all households and 12% of all property owners plan to acquire a home battery in the coming 12 months.

Higher growth rates for photovoltaic installations were likely prevented in part by supply difficulties and price increases for these technologies.³¹ Many households are therefore more likely to be planning than to have actually made a purchase as they are hoping for confirmation from their supplier or a price drop.

Heat pumps follow in second place with 10.3% of all households, and they are in third place for property owners with 11.4%. For property owners, heat pumps have now overtaken wood pellet heating. Households using and planning to acquire heat pumps are up by around 1 percentage point on the previous year. With 2.9% completed and 4.7% planned acquisitions, the use of heat pumps can be expected to rise further in the years ahead.

At around 10%, solar thermal energy remains in the top three most widespread technologies, even occupying second place among property owners, with 18.2%. Across all households, the share of solar thermal energy systems has fallen slightly (around 1 percentage point), while it increased by around 1 percentage point among property owners.³² With 2.5%, the plans of all households are on the same level of the previous year. It is true that fewer owner-occupier households are planning an acquisition than in the previous year but at 3.8% the figure remains well above the average for all households.

At around 2%, combined heat and power (CHP) systems continue to be rather a niche technology, especially with property owners at 1.2%. That is not bound to change any time soon, as plans for acquisitions are below 1% among both households overall and owner-occupiers.

Wood pellet heating appears to have become less relevant for households. Both user numbers and planned acquisitions are around 1 percentage point below the previous year's figure for all households, and even by around 2 percentage points for owner-occupiers. Last year's debate about banning pellet heating and the sharp rise in the price of wood pellets, which almost quadrupled for a while and remain well above pre-2022 prices, might have made wood pellet heating appear less appealing.

Electric vehicle purchases are also experiencing a rather subdued trend. Although the share of 5.7% was slightly above the previous year's figure (5%), purchase plans for the coming 12 months sit at 2.9%, which is well below the previous year's level (5.7%). A likely major reason for this is the unclear incentive landscape at the time of the survey around the turn of the year. In the meantime, new registrations of battery-electric vehicles slumped from more than 100,000 in December 2022 to around 20,000-40,000 vehicles in the months of January to March 2023. After the incentive scheme was expanded again, current registrations are picking up again noticeably, even exceeding those of the months of June to October 2022. Plans for purchases may quite possibly turn out higher again in the next survey wave than in the current one.

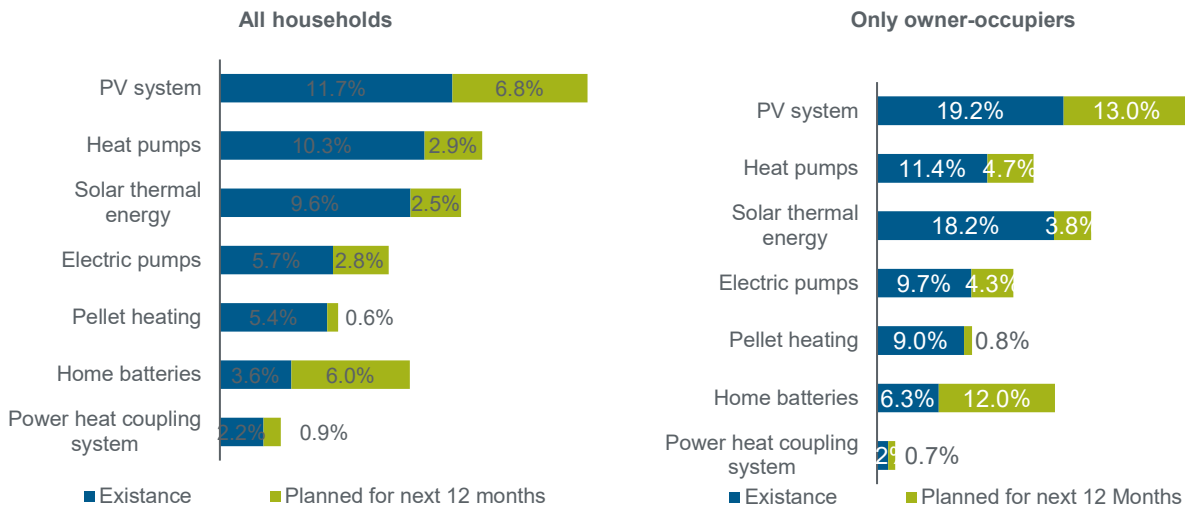
³⁰ As the relevant energy transition technology is not always obvious to a tenant, the technologies were also evaluated for the group of owner-occupiers because it can be assumed that they are generally informed about the energy situation of their property.

³¹ Cf. PV Magazine (2023).

³² The data do not allow any conclusion as to whether the decline can be explained by fewer solar thermal energy systems actually in operation in renting households, or whether it is rather due to fuzziness in the capture of the technology because tenants may not be able to distinguish so clearly between various technologies – for example, PV systems and solar thermal energy – and when in doubt are more likely to declare rooftop installations as photovoltaic than solar thermal.

Figure 16: Heat pumps in second place, PV and home battery systems expected to record highest growth rates

Share of households surveyed for which the energy transition has become more important or less important.



Source: KfW Energy Transition Barometer 2023

4.3 Combining energy transition technologies continues to hold much potential

Propagating the technologies addressed here is decisive for the success of the energy transition. Many play out their strengths primarily in combination with other energy transition technologies. A home battery has little value by itself but when combined with a photovoltaic system it can make a crucial contribution to balancing electricity generation and consumption. The same is true when a PV system is combined with an electric vehicle, enabling vehicles to be charged with green energy and act as a battery. Heat pumps also become more efficient and cost-effective when they use electricity generated (and stored) at home.

A better combination of technologies is therefore desirable both for the energy transition and for the households that use them. Much potential remains in this area. At present, only 20% of owner-occupiers and 6% of all tenants use more than one energy transition technology (Figure 17).

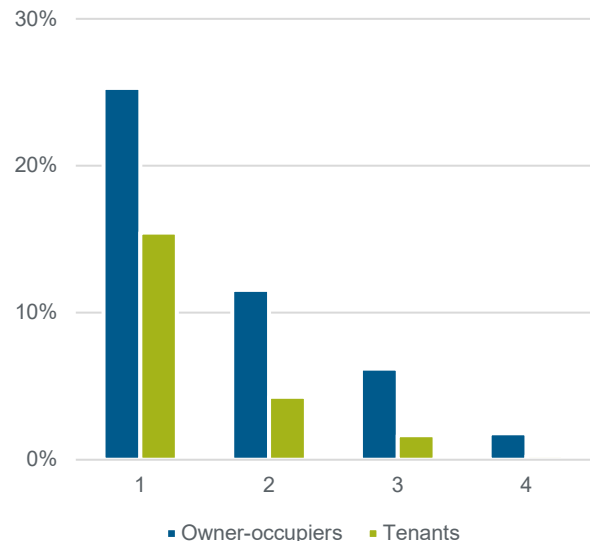
Barely 6% of all owner-occupiers and 2% of all households use 3 technologies, for example a combination of PV system, home battery and heat pump.

Not all combinations are technically sensible. Those who own a solar thermal energy system usually have little or less roof space available for a PV system, while wood pellet heating can rarely be combined soundly with a heat pump. Values of 6 or 7 are therefore not to be expected in Figure 17. Nevertheless, the combina-

tion of electric energy transition technologies in particular – PV system, home battery, heat pump, electric vehicle – holds much potential.

Figure 17: Owner-occupiers are more likely to use more than one energy transition technology

Number of energy transition technologies used by housing situation



Source: KfW Energy Transition Barometer 2023

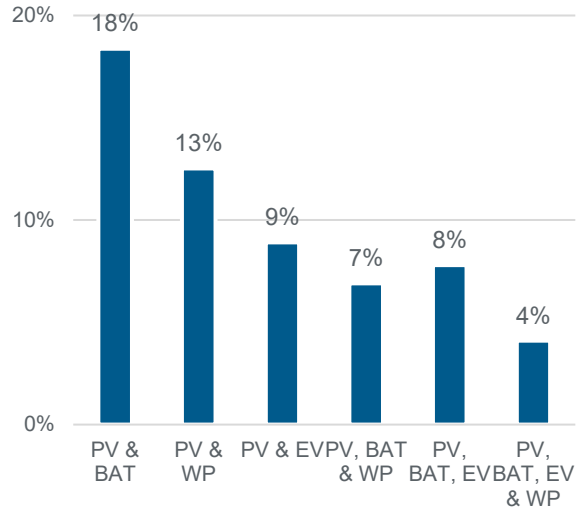
If we look at only these technologies and their combined use, we can also identify considerable additional usage potential (Figure 18). To this end, below we examine the owner-occupiers who already own a PV system. We found that 18% of owner-occupiers surveyed currently use a PV system together with a home battery, the most common combination. Next comes a

PV system combined with a heat pump in 13% and an electric car combined with a PV system in 9% of owner-occupier households.

Three-fold combinations of PV system, home battery and heat pump are used by 7% of owner-occupier households, while 8% combine a PV system, home battery and electric vehicle. So far, only 4% of all owner-occupiers surveyed combine all four technologies.

Figure 18: Further usage potential for combining energy transition technologies

Share of owner-occupiers with a PV system who additionally use a home battery (BAT), a heat pump (HP), an electric vehicle (EV) or a combination of these.



Source: KfW Energy Transition Barometer 2023

5. Barriers to energy upgrades

Most property owners can imagine undertaking energy upgrades.

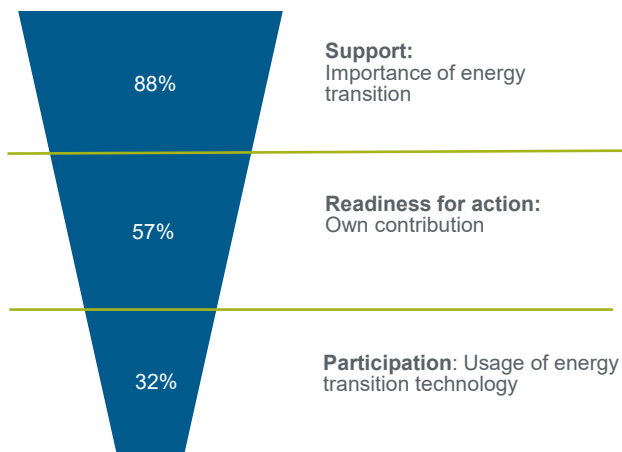
Financial constraints are the most frequently mentioned reason not to upgrade.

Skilled trades play an important role in advice and design as well as implementation of energy transition measures.

5.1 High support for energy transition translates only partly into activity

The share of households actively engaged in the energy transition sits at 32%. Despite the most recent increase, it remains much lower than the share of households that signalled an above-average willingness to become stakeholders and even more noticeably lower than the share of those that regard the energy transition as important or very important (Figure 19).

Figure 19: High support for energy transition translates only partly into activity



Source: KfW Energy Transition Barometer 2023

Therefore, there remains a distinct gap between support for and participation in the energy transition, which must be overcome. One pathway towards greater participation is to eliminate information gaps, for example, when households are insufficiently informed about the energy situation of their dwelling. However, a large portion of households are themselves already actively contributing to eliminating any information deficits.

Under the KfW Energy Transition Barometer 2023, around 46% of households stated that they had concerned themselves with the energy efficiency of

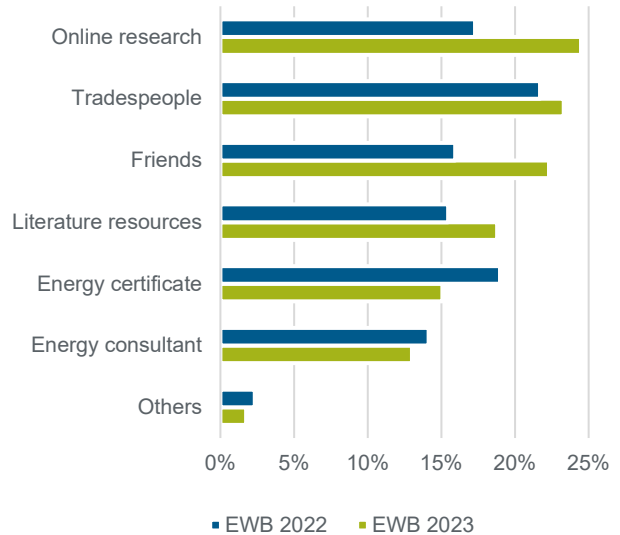
their dwelling in the past year. In the previous year it was a similar share of just under 48%.

The KfW Energy Transition Barometer 2023 revealed that skilled trades play an important role as a source of information and advice for many households in this regard. Almost one in four households (23%) use tradespeople as a source of information, slightly more than a year ago and only moderately less than online research, which is now mentioned most often (25%) (Figure 20).

This is followed by friends and literature resources, which are now also consulted more often as sources of information. The energy certificate, on the other hand, was used less often (only 19%). The share of households using the advice of a certified energy consultant also fell slightly (13%).

Figure 20: Nearly half of households engaged with the topic of energy efficiency

Share of information resources used by households in addressing the energy situation of their dwelling



Source: KfW Energy Transition Barometer 2022 and 2023

Last year, property owners engaged with the energy efficiency of their unit or house more often than tenants (68 vs. 29%) This discrepancy was also identified in the previous years and illustrates that owners are likely to have both a higher personal interest in residing in an energy-efficient dwelling and greater scope for implementing upgrades.

The fact that households' actual activity fell short of the level of overall approval is an often-observed

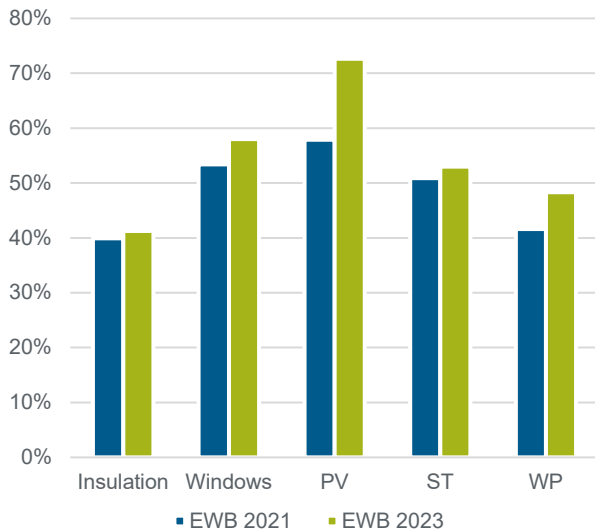
phenomenon.³³ However, what is worth noting is that the number of owners who can generally imagine adopting a specific measure is significantly higher than the number of households that have actually put a measure in place.

Thus, the readiness of private property owners to carry out energy upgrades actually reached new peaks in the current survey. The majority of property owners can now imagine making an energy upgrade such as installing insulation or a photovoltaic (PV) system.

Compared with the KfW Energy Transition Barometer 2021, the number of households that can imagine an acquisition or installation has grown in all the technologies surveyed (Figure 21).³⁴ The most significant increase was recorded for photovoltaic systems.

Figure 21: Most property owners can imagine undertaking energy upgrades

Share of owner-occupiers surveyed who can imagine the acquisition/installation of the measure/technology presented.



Source: KfW Energy Transition Barometer 2021 and 2023

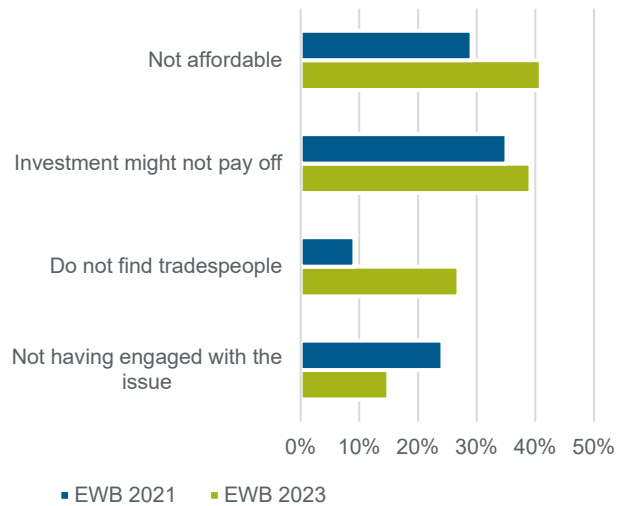
5.2 Financial constraints are the main barrier to an energy upgrade

Asked why they did not put a particular measure in place even though they could imagine doing so in principle, property owners most often cited financial constraints. The most frequent reason cited, at 41%, was that they could not afford the measure (Figure 22). Two years earlier, that figure was only 29%. This probably reflects the reduced financial scope of many

households, for example as a result of increased energy costs or general price rises, as well as sharp increases in construction costs.³⁵ This barrier to upgrades has worsened across a variety of technologies. With respect to insulation, it was mentioned by 45% of property owners under the KfW Energy Transition Barometer 2023, while two years earlier that figure was only 25%. It also worsened substantially for window upgrades (from 32 to 42%), photovoltaic systems (from 27 to 39%) and solar thermal energy systems (from 29 to 37%).

Figure 22: Financial constraints are the main barrier to an energy upgrade

Percentage of reasons cited for not implementing a conceivable upgrade, multiple answers were possible



Source: KfW Energy Transition Barometer 2021 and 2023

The rise was particularly steep in the lowest income group. Whereas under the KfW Energy Transition Barometer 2021 around 37% of property owners in this group reported not being able to afford an upgrade, that figure now stands at around 68%. In the highest income group, on the other hand, the shares rose only moderately (from 26 to 29%).

The assumption that the investment might not pay off was the most frequently mentioned argument against an upgrade two years ago but has now fallen to second place to sit at 39%. With the exception of insulation (up from 20 to 31%), however, there were no significant changes to this impediment for individual technologies between the KfW Energy Transition Barometer 2021 and 2023.

³³ Cf. Carrington et al. (2016).

³⁴ The last time households were asked whether they could imagine carrying out energy upgrades and the barriers they faced was under the KfW Energy Transition Barometer 2021. Cf. Römer and Steinbrecher (2021).

³⁵ Cf. Chapter 2.

Not having engaged with the issue has become much less of a factor. In the KfW Energy Transition Barometer 2023 only just under 15% of property owners cited this as a reason for not upgrading, whereas that figure was nearly twice as high (24%) two years before. This decline is likely also attributable to the fact that many households have paid more attention to the energy situation of their dwelling in the past two years (see Figure 20).

5.3 Skilled trades are a central pillar of the energy transition

Qualified tradespeople are an important asset not just for advising on and designing energy efficiency measures. They are also indispensable for putting the relevant measures in place. If demand for tradespeople exceeds supply, that can slow the pace of the energy transition.

Even if financial aspects remain by far the most important impediment to energy upgrades, the findings of the KfW Energy Transition Barometer indicate that the availability of tradespeople is becoming increasingly relevant. Whereas 9% of owner-occupiers who could generally envision upgrading their home reported under the KfW Energy Transition Barometer 2021 that a shortage of tradespeople was hampering the implementation of a measure, that figure roughly tripled to 27%. The rise generally applies to all energy transition technologies contemplated here but most prominently to photovoltaic and solar thermal energy systems (Figure 23).

The views expressed by households illustrate the very important role which a highly skilled trades sector plays in the energy transition. After all, the need for the many advisory, installation and maintenance services requires an adequate supply of skilled trades people with corresponding qualifications.

According to the German Confederation of Skilled Crafts, some 450,000 trades businesses with nearly 2.5 million employees currently work in 30 climate-relevant trades.³⁶ It is true that apprenticeship numbers were on the rise again in various trades in the past years but they appear to be insufficient to meet the growing need created by the intended increase in the rate of energy upgrades, in part because of the difficult succession situation of many firms.³⁷ The Central

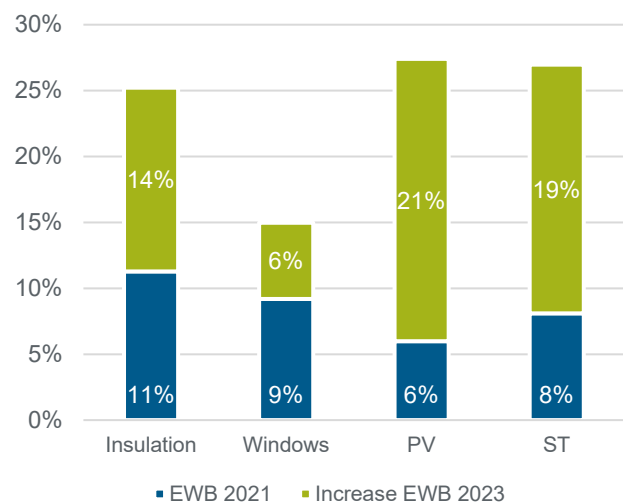
³⁶ Das Handwerk (2023).

³⁷ Thus, construction and civil engineering was among the sectors where SMEs had the greatest succession problems, with around 11% of businesses planning to shut down by 2025. Cf. Leifels and Schwartz (2022).

Association for Sanitation, Heating and Air Conditioning estimates that around 60,000 additional installers per year are required for the installation of the intended 6 million heat pumps up to the year 2030. The situation in the electrical trade appears to be similar.³⁸ The KfW-ifo Skilled Labour Barometer found that skills shortages reached historic highs in the second half of 2023, including in construction and civil engineering.³⁹

Figure 23: Tradespeople are in short supply for many technologies

Increases in mentions of skills shortages as impediments to upgrades.



Guide: The graph illustrates the share of mentions of skills shortages as an obstacle to upgrades in the KfW Energy Transition Barometer 2021 (blue bar) and the increase of these mentions in the KfW Energy Transition Barometer 2023 (green bar). Each bar combined shows the overall percentage of each barrier to upgrades mentioned in the KfW Energy Transition Barometer 2023, e.g., 25% for insulation.

Source: KfW Energy Transition Barometer 2021 and 2023

These findings are of great relevance to the energy transition as the shortage of skilled trades people also represents a non-monetary investment obstacle that requires an economic-policy response. Furthermore, responding to the situation in the skilled trades sector is a challenge with a view to the roadmap of the energy transition because many measures such as raising the number of graduates take time to have an effect.

Policymakers have recognised the problem, as illustrated by the current support initiatives which aim to train at least 17,500 tradespeople as well as 3,000 experts each year to provide planning services and energy advice on existing heat pumps.⁴⁰ Joint activities

³⁸ Cf. Birk (2022).

³⁹ Cf. Müller (2023).

⁴⁰ Cf. BMWK (2023).

with chambers of trades are also welcome, such as the recently inaugurated heat pump laboratory at the Bildungs- und Innovationscampus Handwerk (Training and Innovation Campus for Skilled Trades).⁴¹

However, there will also be a need for skilled trades initiatives for the other trades if, for example, significantly greater potential for expansion is to be developed for insulation, PV and solar thermal energy systems.⁴²

Economic policymakers thus face the challenge of not just maintaining the support and activity of households for the energy transition but at the same time creating conditions in which strong investment and modernisation activities by businesses and households can actually take shape.

⁴¹ Cf. Press release by the Federal Ministry for Economic affairs and Climate Action: Klimawende: Eröffnung des Wärmepumpenlabors am Bildungs- und Innovationscampus Handwerk (*Climate transition: Inauguration of the heat pump laboratory at the training and innovation campus for skilled trades – our title translation, in German*) dated 31 August 2023.

⁴² For example, according to the Cologne Institute for Economic Research (IW), speeding up the expansion of renewable energy generation capacity will require more than 200,000 additional tradespeople. Cf. Cologne Institute for Economic Research (2022).

6. Action by private landlords in the energy transition

Almost 10% of households surveyed rent out at least one property.

Nearly two thirds of landlords surveyed see a need for upgrades today or within the next 10 years.

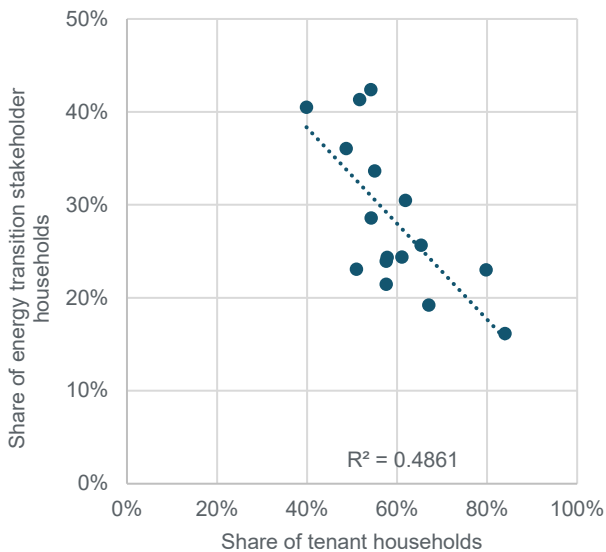
Financial constraints are the most frequent barriers to modernisation but coordination with other donors and bottlenecks in the construction sector are also limiting factors.

6.1 Private landlords are an important cornerstone of the energy transition for private households

It is noteworthy that tenants are much less involved in energy transition measures than property owners (Figure 24).

Figure 24: Tenants are less likely to be energy transition stakeholders

State average of tenant households relative to households that are active in the energy transition (averages in ETB 2022 and ETB 2023).



Source: KfW Energy Transition Barometer 2023, Destatis (2023b).

This finding is of relevance for the energy transition, as the home ownership rate in Germany is comparatively low. In the KfW Energy Transition Barometer 2023, 55% of households identified themselves as tenants, showing that the survey very accurately reflects the overall situation in Germany.⁴³ The highest tenancy rates are in eastern Germany (64%). In southern

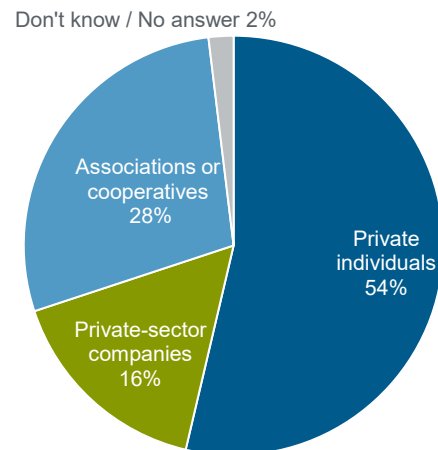
⁴³ In Germany around 53.5% of all properties are tenanted. Cf. Destatis et al. (2021).

Germany, on the other hand, fewer than half of all households are tenants (47%). There is also an urban-rural divide. The tenancy rate in large cities is 75%, much higher than in rural communities, where it is only around 29%.

A major reason for tenants to be less engaged is the fact that many energy transition activities require interventions that must be undertaken by the property owner, such as insulating the building or replacing its heating system. Even so, 13% of the tenanted households surveyed asked their landlords last year about improving the property's energy performance. It is therefore necessary to better understand what prevents landlords from upgrading their property in order to improve the tenants' energy situation.

Figure 25: Most tenanted households have private landlords

Shares of landlord groups renting out to the households surveyed.



Source: KfW Energy Transition Barometer 2023

Most tenanted dwellings in Germany belong to private individuals. Asked about their landlords, 54% of the tenanted households surveyed responded that these were private owners (Figure 25).⁴⁴ The current KfW Energy Transition Barometer takes a closer look at the group of private landlords, which is key to the rental market. All households surveyed that rent out a property themselves were asked about the energy standards of that property and relevant plans to upgrade them.

⁴⁴ Overall, around 44% of all dwellings in Germany are rented out by private owners, and a further 22% belong to communities of property owners. Cf. BMWSB (2023).

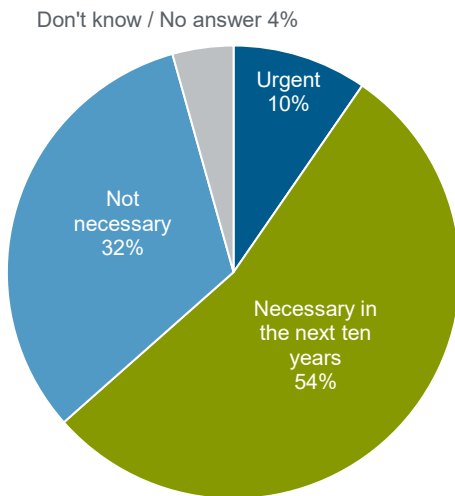
In total, around 9% of households surveyed in the KfW Energy Transition Barometer 2023 rent out at least one housing unit. In most cases this is an individual unit, at 46%, while a detached house is less common (10%). Around 43% of landlord households rent out more than one property.

6.2 Majority of private landlords see a need for upgrades today or in the future

Asked about the need for energy upgrades, 10% of the landlords surveyed responded that there was an immediate need for action. A further 54% see a need for upgrades over the next ten years. Around one third of the landlords (32%) see no need to improve the property's energy performance (Figure 26). The need for upgrades is mentioned most frequently in western Germany (72%) and least often in eastern Germany (46%).⁴⁵ At the same time, there are no clear differences between rural and urban regions.

Figure 26: Nearly two thirds of landlords see a need for upgrades now or in the future

Views on the need for energy upgrades of privately rented properties.



Source: KfW Energy Transition Barometer 2023

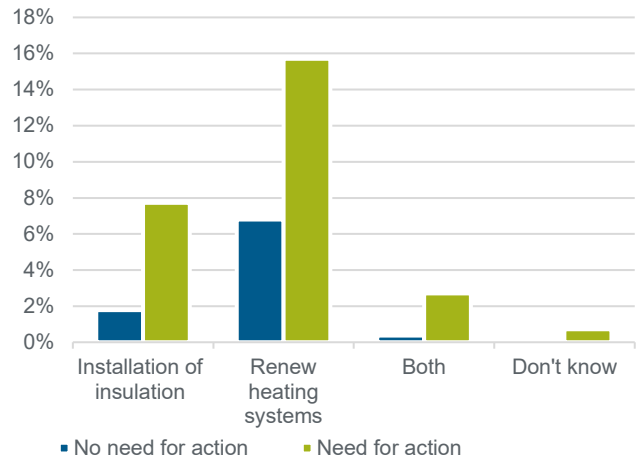
Overall, around 20% of the landlords surveyed plan to carry out energy upgrades in the next 12 months, especially new heating systems. As expected, more measures are planned in properties that require energy upgrades (Figure 27). Around 16% of landlords who see an urgent or foreseeable need for upgrades to their properties plan to replace the heating system in the short term, just under 8% intend to install insulation and

⁴⁵ However, in eastern Germany 11% of the landlords surveyed refused to answer this question, while that figure was only between 1% and 4% in the remaining regions.

nearly 3% want a combination of both. Of the landlords who see an urgent need for action, around 60% have plans for implementing a measure in the coming 12 months.⁴⁶ In properties for which landlords see no need for action, these figures are significantly lower (2% for insulation, 7% for heating, 0.4% for both).

Figure 27: Landlords who see a need for action are more likely to plan an energy upgrade

Percentage of planned energy upgrades in the coming 12 months, by need for action.



Source: KfW Energy Transition Barometer 2023

Of the landlords who have not planned any specific measures, a notable 53% can generally imagine installing insulation or renewing the heating system. This is particularly true of landlords who see a need for upgrading their property in the future (65%), while only 34% of landlords who see no need for action are open to an energy upgrade.

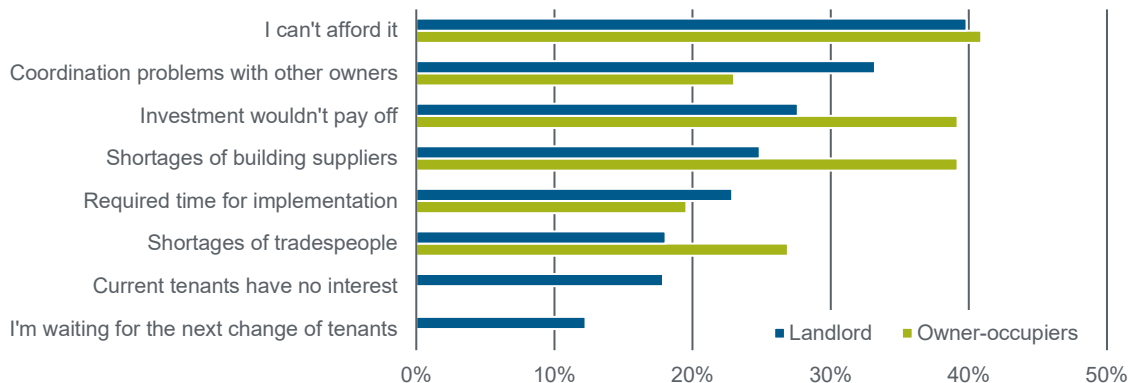
6.3 Financial constraints are the reason most frequently mentioned by landlords for not upgrading

Asked about the barriers and impediments to upgrading home energy performance, respondents mentioned financial constraints most often. This applies both to the question why an upgrade is not carried out and to the question why an upgrade is generally not being considered (Figure 28).

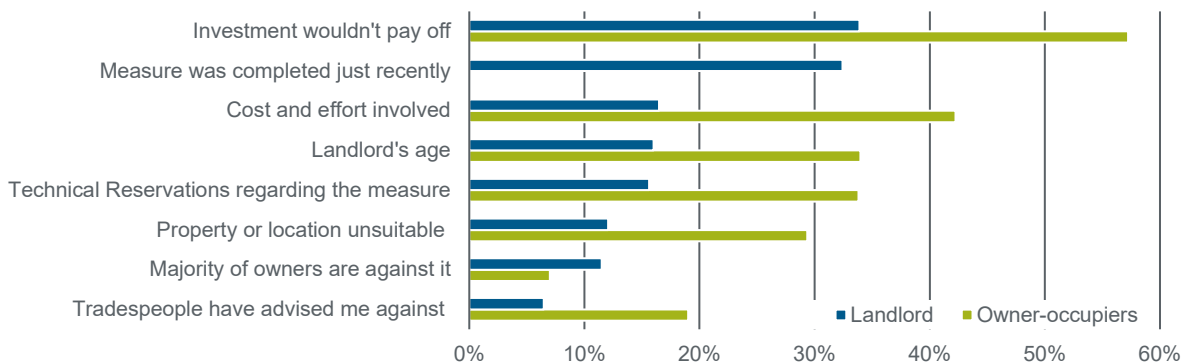
⁴⁶ On average, 5.4% of all private landlords plan to install insulation in their tenanted property, which is roughly the same share as among owners or owner-occupiers. Of these, 4.8% plan to install insulation, or 5.5% if triple glazing is also counted.

Figure 28: Barriers and impediments to upgrading home energy performance

Answers provided to the question: 'What is keeping you from implementing an energy upgrade?'



Answers provided to the question: 'Why can you not imagine implementing an energy upgrade?'



Note: For the answers 'I can't decide that alone', 'Supply bottlenecks for building materials/equipment' and 'Installation is too expensive', property owners were asked only about barriers to photovoltaic systems, solar thermal systems and heat pumps. For all other reasons, the answers on building insulation and thermal insulation windows were also taken into account. The answer 'Energy upgrade was completed just recently' was captured only for private landlords but not for all property owners.

Source: KfW Energy Transition Barometer 2023

Almost 40% of private landlords who can generally imagine carrying out an energy upgrade responded that they could not afford it. A further 28% assume that the investment would not pay off. The latter response is also the most frequent answer to the question why landlords generally cannot imagine carrying out an energy upgrade.

Other frequently cited reasons that stand in the way of a generally conceivable upgrade are coordination problems with other owners (33%), shortages of building supplies (25%) and tradespeople (18%) as well as the time required for implementation (23%).

Of the reasons for which private landlords generally cannot imagine implementing an energy upgrade, the most frequent one mentioned was that a measure was completed just recently (32%), followed by the cost and effort involved (17%), the landlord's age (16%) and technical concerns regarding the measure (16%).

This shows a picture that is similar to the barriers to upgrades mentioned by owner-occupiers in Section 0. Landlords mentioned financial constraints as an impediment to installing upgrades on their property at a similar rate as owner-occupiers (38 vs. 43%). Landlords were slightly less concerned than owner-occupiers that an investment would not pay off (28 vs. 38%), which is likely due in part to the fact that landlords can pass part of the costs on to tenants or deduct them from their income tax. Shortages of building supplies or tradespeople were also mentioned quite frequently by landlords.

On the other hand, a relevant argument for many landlords was that they are unable to decide on the upgrade alone, for example because they are required to coordinate with other owners or respect the tenants' interests. The need to involve additional groups of interest in modernisation plans thus appears to constitute an additional barrier to upgrading tenanted properties.

Similar patterns in regard to the reasons that generally speak against upgrades can be observed for owner-occupiers and landlords, even if the shares are significantly lower for landlords. Most of the differences can be explained by the different conditions faced by the two groups.

Thus, there is a clear difference in cost-effectiveness, which is mentioned nearly twice as often by owner-occupiers (57%) as by landlords (34%). This is likely due to possibilities for landlords to tax deduct or pass on the costs. For 42% of owner-occupiers, the effort and inconvenience associated with the measure was a general reason not to make upgrades, while only 17% of landlords cited this as a reason.

As upgrades cause temporary limitations in the quality of living and unfold their positive effects only in the long term, it is understandable that landlords are much less likely to cite this as a barrier.

The same is likely to apply to the different views relating to the respondents' own age, which plays a different role in a dwelling occupied by the owner than in a tenanted one, which tends to be a financial investment. The more dispassionate relationship with a tenanted object might also cause landlords not to see reasons such as 'Not convinced by the measure' and 'Property or location not suitable' as general barriers. In other words, it is possible that the frequent mentions by owner-occupiers are due to a diffuse sense of unease, which might fade into the background after closer examination of the issue.

7. Conclusion and outlook

The success of the energy transition is crucial both for achieving the climate targets and for making Germany more energy independent. Households are responsible for almost 40% of Germany's carbon emissions. With the support of policymakers, they will need to find a way to eliminate these emissions almost completely within the next 22 years – by cutting energy use and switching to zero-emission energy sources for mobility and residential uses.

The findings of the KfW Energy Transition Barometer 2023 are encouraging. Not only do they illustrate that households are very supportive of the energy transition and showing strong willingness to play a part; they also show that significantly more households used energy transition technologies last year than in prior years. Almost one third of all households are currently using technologies such as photovoltaic solar systems or heat pumps. A further 7% plan to acquire such technologies this year. This momentum now needs to be upheld by creating enabling economic-policy conditions.

To this end, it is necessary to generate and maintain high acceptance of the policy measures that are in place to advance the energy transition among the population. Of central importance is that the population perceives it as fair and trusts policymakers because it is most likely to actively support the course chosen if it views the measures as important and fair. Alleviating social hardships, for example through the gas and electricity price brake, was an important policy measure for ensuring the population's acceptance even in times of crisis.

Besides acceptance, however, what the energy transition requires above all is action. So, more households need to be won over for the necessary measures and investments. The most common hurdles are financial barriers. They must therefore be eliminated to increase households' engagement. In the medium term, however, these financial hurdles must also be continuously reduced by making energy transition technologies more affordable and highlighting the fact that their use brings predictable economic benefits for households.

Harnessing the potential of combining technologies in a targeted manner can also be helpful to achieve this. Thus, the effectiveness of photovoltaic systems can be improved by storing excess output in a home battery or electric vehicle. Significant potential exists here, as currently fewer than 20% of photovoltaic solar system owners also use a home battery and only 9% use an electric car.

In addition to economic factors, the skilled trades sector plays an important role in providing advice and designing as well as implementing measures. The availability of well-trained skilled trades people is crucial to the deployment of energy transition technologies in households and their reliable operation. The Federal Government's skilled trades strategies should therefore also be aligned with the needs of the energy transition. The current support initiatives of the German Federal Government for strengthening further training measures for tradespeople, particularly in the area of heat pumps, are pointing in the right direction.

Bottlenecks in the supply of the required technologies and building materials must be identified and addressed early so that households' willingness to act can also be translated into action without delay.

The findings of the KfW Energy Transition Barometer 2023 reveal unabated widespread approval of the energy transition among households even in times of high energy costs, and they show that many households want to actively participate in it. The prerequisites for a successful energy transition among households are therefore fulfilled.

A balanced and incentive-compatible promotional scheme can help to provide households with targeted support in funding suitable measures. An effective skilled trade sector can help to put the measures in place in a timely manner. If the enabling conditions can be designed in such a way that action by households is not frustrated by financial or logistical barriers, they will be able in the future to make a significant contribution to achieving the climate targets and making Germany more energy independent.

KfW Energy Transition Barometer

The KfW Energy Transition Barometer is a study conducted annually since 2018 on the basis of a survey of a representative random sample of some 4,000 households in Germany. Responses from each household were received from one household member of full age who takes decisions on household energy supply and consumption. The aim of the survey was to find out to what extent energy transition technologies are being used in the different households. The survey also covered any planned use in order to estimate in what areas the greatest growth was to be expected. Taken together, the data collected provide an overview of current sentiment and households' participation in the energy transition in Germany.

The field phase of the Energy Transition Barometer 2023 comprised around twelve field weeks from 5 December 2022 to 30 January 2023 and from 7 March to 12 April 2023.

Further information on the structure of the current survey of the KfW Energy Transition Barometer can be taken from the related Volume of tables and methods [here](#).

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