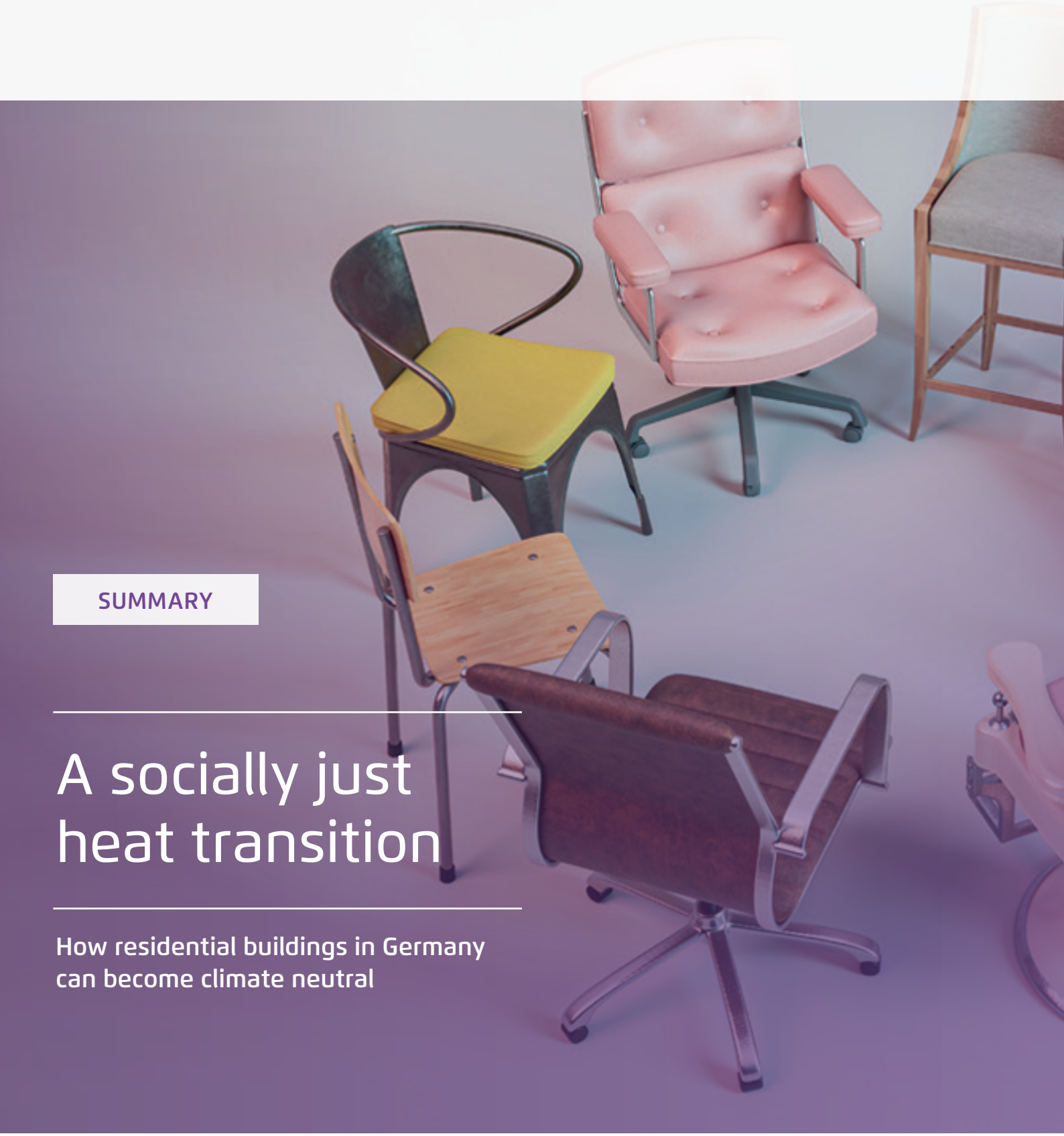
Agora Energiewende



SUMMARY

A socially just heat transition

How residential buildings in Germany can become climate neutral

Fraunhofer IEE

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Summary
A socially just heat transition. How residential buildings in Germany can become climate neutral.

The full study is available in German under the title
Soziale Wärmewende. Wie Wohngebäude sozialverträglich klimaneutral werden.

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Preface

Dear reader,

The heat transition is bringing climate action directly into people's homes. In Germany, most households still rely on fossil fuels for heating – often in buildings in need of renovation. As a result, the country is falling short of its climate targets in the buildings sector. To change this, millions of people will need to invest in climate-friendly heating systems and improved insulation. But for many homeowners, these upgrades are simply unaffordable, and renters often have no say in the matter. They all risk facing even more pressure in an already tight housing market.

So how can we ensure the heat transition succeeds without placing additional social burdens on people? This study uses a simulation to explore how different policy tools affect the decisions of key social groups.

The result: with the right policy mix, a socially fair heat transition is possible. The technical conditions have never been better. The right price signals, a clear regulatory framework and targeted support programmes can enable all households to make the switch. The initial investment phase will be followed by long-term relief.

But the study also makes clear: especially for homeowners and renters in lower income groups, further reforms are needed – reforms that shield them from added costs and strengthen public support for climate policy.

I wish you an insightful read.

Julia Bläsius
Director Germany, Agora Energiewende

Key findings at a glance

1 **Germany's heat transition is achievable without exacerbating social tensions in the housing market.** The technical options for climate-neutral heating have never been better. Supporting homeowners in making timely investments while protecting renters from high costs will be key to ensuring the climate-neutral modernisation of buildings is a success.

2 **A balanced policy mix is needed now to enable the transition to climate-neutral buildings by 2045.** A key requirement is the reliable expansion of heat and electricity distribution networks, along with a gradual withdrawal from gas distribution networks. To scale up climate-friendly technologies, clear renewable energy requirements for heating system replacements, targeted subsidies and a cost advantage for electricity over gas are essential. This would enable nearly seven million climate-friendly heating systems to be installed in Germany by 2030.

3 **Renters and low-income homeowners require additional support.** Subsidies should be reallocated to flow specifically to households with limited capital and inefficient buildings, with subsidies covering up to nearly 100 percent of costs for the lowest-income groups. At the same time, rent increases must be curbed, for example by granting landlords a bonus in exchange for passing on lower modernisation costs onto tenants. In addition, households facing hardship will require targeted social support.

4 **With swift action, the bulk of investments needed for the heat transition in Germany can be realised by 2040 – while keeping heating costs stable.** With the proposed policy mix, emissions from buildings could be reduced to zero by 2045 and heating costs maintained at today's level. In an increasingly complex geopolitical environment, this would make consumers less dependent of fossil energy imports and contribute to a more resilient energy supply.

English summary

In the face of the housing crisis and financial pressures, climate targets in the buildings sector seem challenging. However, the technical options that exist for the heat transition are better than ever before. Progress in renewable district heating and heat pump systems for virtually every type of building now allows for scalable modernisation. The right policy mix can facilitate a socially just heat transition. This policy mix must be tailored to the different options available to private, municipal and institutional building owners. It must also ensure the fair distribution of costs and protect vulnerable groups. To test the effectiveness of such a mix, this study uses an agent-based simulation model, where simulated building owners respond to the policy framework. Their individual decisions influence the trajectory of the building stock's development and reveal the distributional effects.

Climate neutrality in the buildings sector can be achieved by comprehensively replacing fossil fuel-based heating systems and making moderate improvements to building envelopes. The simulation shows that this approach would reduce carbon dioxide (CO_2) emissions in the sector to zero by 2045. By 2030, the policy mix would result in cumulative savings of around 10 million tonnes of CO_2 equivalents compared to a business-as-usual scenario, and almost seven million climate-friendly heating systems could be installed. By 2045, around two thirds of all heating systems will be decentralised heat pumps, with district heating serving just over 20 percent of homes. Overall heating energy consumption would fall by around 30 percent, with the most significant efficiency gains seen in older single- and two-family homes.

The policy mix achieves climate neutrality primarily through the interaction of four key levers:

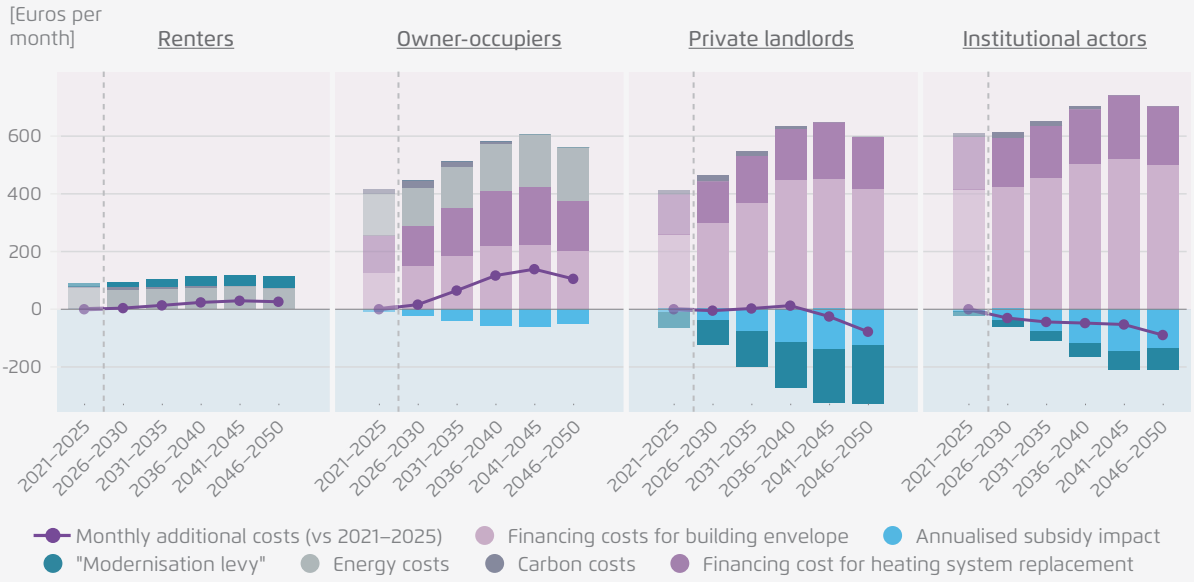
- → **Conversion of the municipal heating infrastructure,** including extending and decarbonising heat grids, upgrading power grids and decommissioning gas grids. Equity-enhancing measures and targeted subsidies support suppliers in making these investments. The implementation of the European Internal Gas Market Directive creates legal certainty for gas network operators.
- → **Clear framework for replacing heating systems:** The Building Energy Act stimulates the market for climate-friendly heating systems and avoids locking in fossil fuel technologies. It provides the heating industry, trades and consumers with planning certainty. To this end, the law will be simplified. However, the requirement for new heating systems to operate with 65 percent renewable energy remains.
- → **Efficient and socially restructured subsidies for buildings:** Key elements include consistent income-based differentiation, with households on the lowest incomes receiving up to almost 100 percent support. Subsidies for renovations should be tied to the level of improvement achieved rather than the final outcome. This puts the focus on particularly inefficient buildings that have high savings potential.
- → **A favourable electricity-to-gas price ratio** makes heat pumps an appealing option. This can be achieved through a combination of short-term relief, such as reduced grid charges and electricity taxes. Also important are long-term cost-cutting measures, including through the consistent expansion of renewable energy and the implementation of a targeted package to reduce grid-related costs and encourage flexibility. While a carbon price of 166 euros per tonne by 2045 contributes to this shift, it does not have a decisive steering effect.

The right policy mix makes a socially just heat transition possible → Fig. 1

The climate targets will be achieved through the interaction of **four key levers:**

1. Locally available climate-neutral electricity and heat supply
2. A clear framework for the replacement of heating systems
3. Efficient and socially just development of financial support
4. Favourable electricity-to-gas price ratio

Average **monthly costs** for different groups and how they compare to today:



Additional instruments are needed to ensure fairer distribution and protect vulnerable groups:

- Reform of the "modernisation levy" and incentive to limit rent increases
- Socially just reallocation of subsidies, access to affordable financing solutions
- Additional **social policy measures** to address individual cases of hardship

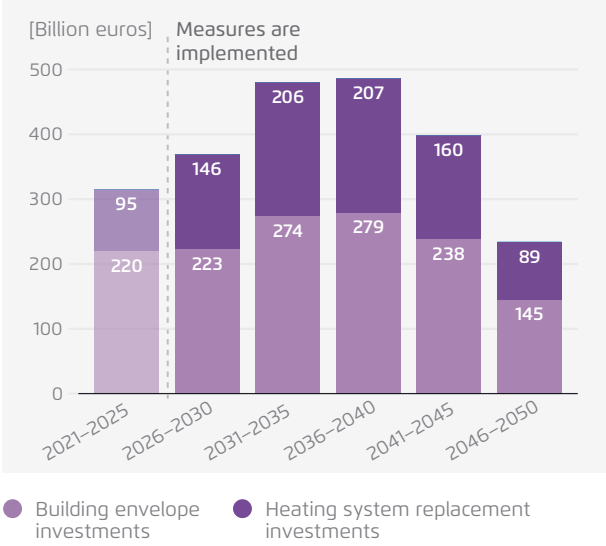
Agora Energiewende and Fraunhofer IEE (2025)

Social tensions must be considered. Despite the socially focussed design of the support scheme, the burdens of the transition remain unevenly distributed. While landlords can generate additional income, owner-occupiers face the highest absolute costs, while tenants experience the least favourable cost development. Additional instruments are therefore needed to achieve a fairer distribution and protect vulnerable groups:

- → **Reforming the *Modernisierungsumlage*, or "modernisation levy" and subsidy incentive to limit rent increases:** For the rental market, this includes introducing a "rent brake" in exchange for a subsidy bonus for landlords, and strengthening the climate policy component in social housing construction.
- → **Social restructuring of funding and access to favourable financing solutions:** Subsidies should be realigned so that they specifically benefit households with limited financial resources, with a subsidy rate of up to almost 100 percent for those on the lowest incomes. Low-income homeowners need access to affordable loans or energy services with affordable monthly instalments. This can be achieved through state guarantees and by subsidising leasing models.
- → **Complementary social policy measures:** However, energy and climate policy alone cannot adequately meet the goal of affordable housing. They must interact with suitable housing and social policy measures.

By 2040, most modernisation work will have been completed, while heating costs will remain stable. Investment expenditure on heating and building envelopes will decrease again after 2045, falling to around 25 percent below current levels. Once climate neutrality has been achieved, residential buildings will no longer depend on imported fossil fuels. This will boost overall economic resilience and ensure heating costs remain affordable in the long term, regardless of geopolitical developments.

Investments in building envelopes and heating systems (in 5-year spans) → Fig. 2



Agora Energiewende and Fraunhofer IEE (2025), in real terms (2020)

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About Agora Energiewende
Agora Energiewende develops scientifically sound and politically feasible strategies for a successful pathway to climate neutrality – in Germany, Europe and internationally. The organisation which is part of the Agora Think Tanks works independently of economic and partisan interests. Its only commitment is to climate action.

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