

Fact check: The state of energy renovation in Germany

Without a drastic improvement in energy efficiency in buildings, Germany will not reach its climate goals, despite "Efficiency First" being one of the key principles. However, the housing industry lobby regularly questions the effectiveness of energy efficiency measures. The goal of Deutsche Umwelthilfe (DUH) in this fact check is to address myths and claims frequently cited by housing industry, particularly by German housing industry players.

Claim 1: "The billions that homeowners and the housing industry have invested in energy efficiency in homes and buildings have not led to large reductions in greenhouse gas emissions."

Fact: Between 2010 and 2018, 341 billion euros¹ were invested in energy renovations in residential buildings in Germany. These investments led to reductions in greenhouse gas emissions of 21%.² This calculation is, however, not weather-adjusted.

- Between 2010 and 2018³ emission from the German building sector (residential buildings) fell by **134 million tons of CO₂**.
- In contrast to other sectors (e.g. the transport sector, where there have been no reductions in emissions since 1990), the building sector shows significant reductions in CO₂ emissions. However, to achieve a climate-neutral building stock in 2050 and the sector target in 2030 (a reduction from 117 million tons of CO₂ equivalent in 2018 to a maximum of 70 million tons in 2030⁴), these reductions need to be significantly higher. In order to achieve this, energy efficiency is a key instrument:

Table 1: Greenhouse gas savings by sector between 2010 and 2018, own calculations⁵

CO ₂ equivalent in million t/a	Energy industry	Industry	Traffic	Building sector	Agriculture
2010	368	188	153	149	70
2018	305	195	162	117	70
Difference in %	-17	+ 4	+6	-21	0

¹ Bundesinstitut für Bau-, Stadt- und Raumforschung (2019): Strukturdaten zur Produktion und Beschäftigung im Baugewerbe Berechnungen für das Jahr 2018, <https://www.bbsr.bund.de/BBSR/DE/veroeffentlichungen/bbsr-online/2019/bbsr-online-17-2019-dl.pdf?blob=publicationFile&v=1>, & Bundesinstitut für Bau-, Stadt- und Raumforschung (2016): Strukturdaten zur Produktion und Beschäftigung im Baugewerbe Berechnungen für das Jahr 2015, <https://www.bbsr.bund.de/BBSR/DE/veroeffentlichungen/bbsr-online/2016/bbsr-online-09-2016-dl.pdf?blob=publicationFile&v=1>

² Deutscher Bundestag Drucksache 19/22670 (2020): Antwort der Bundesregierung auf die Kleine Anfrage der Abgeordneten Daniel Föst, Frank Sitta, Christine Aschenberg-Dugnus, weiterer Abgeordneter und der Fraktion der FDP – Drucksache 19/21967 – Berichte über mangelnde Effizienz beim Klimaschutz im Gebäudesektor, <http://dipbt.bundestag.de/dip21/btd/19/226/1922670.pdf>

³ Calculation on basis of 2

⁴ Bundesministerium für Wirtschaft und Energie (2020): Klimaschutzprogramm 2030, <https://www.bmwi.de/Redaktion/DE/Artikel/Industrie/klimaschutzprogramm-2030.html#:~:text=Im%20Jahr%202030%20d%C3%BCrfen%20im,sind%20zus%C3%A4tzliche%2C%20wirkungsvolle%20Ma%C3%9Fnahmen%20erforderlich.>

⁵ Calculation on basis of: Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit (BMU) (2020): Klimaschutz in Zahlen Fakten, Trends und Impulse deutscher Klimapolitik, edition 2020.

- From 2008 to 2018, the final energy consumption of the building sector has been reduced by 13.6%.⁶ On the **level of individual buildings**, studies have also shown significant **energy savings of up to 95%**, depending on the depth of renovation, the measures implemented and the energy performance.^{7,8,9,10,11}

In fact, while 341 billion euros in investment is a large sum, it must be put into perspective:

- **Only around 18,000 euros were invested per building**, when breaking down the 341 billion euros to the existing 19 million residential buildings in Germany.¹² Even if only those buildings are included that are actually in need of renovation, i.e. built before 1991 (approx. 14 million buildings), this corresponds to an average of only 24,400 euros per building in ten years. This amount is not sufficient for large-scale renovations in line with the climate targets, especially when considering that the acquisition costs of a heat pump amounts to between 11,000 and 24,000 euros.¹³ This underlines the relevance for public funding and subsidies.
- The **investment volume of 341 billion euros includes** not only insulation, but also the **replacement of doors and windows, renewal of heating and solar thermal/photovoltaics**. This sum includes legally required, technically necessary or economically self-supporting maintenance measures that have to be carried out anyway, such as the replacement of heating systems after 30 years.
- While more and more money is spent on modernization measures, the share of spending on energy-related renovations is actually decreasing: The annual spending on modernization measures in the residential building stock rose from 119 to 168 billion euros between 2010 and 2019, which corresponds to a 40% increase. In contrast to this significant rise, the annual spending on energy refurbishments rose by only 13% from 39 to 44 billion euros.¹⁴ **In Germany, the share of energy renovation measures in total renovation measures has decreased from one-third to one-quarter.** This is also reflected in the **low renovation rate of less than 1%**, which would have to be at least 2% to achieve the climate targets.
- **In addition to achieving a higher renovation rate, ambitious measures and full renovations must be carried out. This is the only way to achieve the necessary renovation depth and reduction in energy consumption. Current requirements in German regulatory law are not sufficient to achieve this.** The efficiency standards in existing buildings have not been raised since 2009 and there is only inadequate or no monitoring of the implementation of the measures. In 2019, for example, DUH found a lack of enforcement in 15 of 16 federal states in Germany based on an inquiry under the Environmental Information Act. Only the federal state Bremen was able to provide figures on the number of random checks carried out on Energy Performance Certificates (in 2018, however, only six random checks were carried out in total).¹⁵

⁶ Bundesministerium für Wirtschaft und Energie (2020): Langfristige Renovierungsstrategie der Bundesregierung, <https://www.bmwi.de/Redaktion/DE/Publikationen/Energie/langfristige-renovierungsstrategie-der-bundesregierung.html>

⁷ Wolff, A., Weber, I., Gill, B., Schubert, J., & Schneider, M. (2017): Tackling the interplay of occupants' heating practices and building physics: Insights from a German mixed methods study. *Energy research & social science*, 32, 65-75.

⁸ Born, R., Diefenbach, N., & Loga, T. (2003): Energieeinsparung durch Verbesserung des Wärmeschutzes und Modernisierung der Heizungsanlage für 31 Musterhäuser der Gebäudetypologie. Endbericht zum gleichnamigen Projekt, Institut für Wohnen und Umwelt GmbH, Darmstadt.

⁹ Stolte, C., Marcinek, H., Bigalke, U., & Zeng, Y. (2013): Auswertung von Verbrauchskennwerten energieeffizient sanierter Wohngebäude. Begleitforschung zum dena-Modellvorhaben Effizienzhäuser, 1-19.

¹⁰ Cali, D., Heesen, F., Osterhage, T., Streblov, R., Madlener, R., & Müller, D. (2016): Energieeinsparpotenzial sanierter Wohngebäude unter Berücksichtigung realer Nutzungsbedingungen. Fraunhofer IRB Verlag.

¹¹ Deutsches Energieberater-Netzwerk e.V. (2020): Hocheffiziente energetische Sanierung mit Passivhauskomponenten im sozialen Wohnungsbau, <https://www.deutsches-energieberaternetzwerk.de/hocheffiziente-energetische-sanierung-mit-passivhauskomponenten-im-sozialen-wohnungsbau/>

¹² Statistisches Bundesamt (2019) Gebäude und Wohnungen. Bestand an Wohnungen und Wohngebäuden Bauabgang von Wohnungen und Wohngebäuden. Lange Reihen ab 1969 - 2019 im Gebäudebestand, https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Wohnen/Publikationen/Downloads-Wohnen/fortschreibung-wohnungsbestand-pdf-5312301.pdf?__blob=publicationFile

¹³ Calculation on basis of CO2online.de, <https://www.co2online.de/modernisieren-und-bauen/waermepumpe/waermepumpe-kosten-verbrauch/#c159773>.

¹⁴ Deutsches Institut für Wirtschaftsforschung e.V. (2020): DIW Wochenbericht 40 2020, https://www.diw.de/documents/publikationen/73/diw_01.c.799881.de/20-40.pdf

¹⁵ Deutsche Umwelthilfe (2020) Vollzug der EnEV durch die Bundesländer. Auswertung einer Abfrage nach dem Umweltinformationsgesetz (UIG). https://www.duh.de/fileadmin/user_upload/download/Pressemitteilungen/Energieeffizienz/Vollzug_Gebauedesanierung_Umfrage_190823.pdf

Conclusion:

The current level of funding is too low, and existing regulations too weak, to achieve a profound reduction of the energy consumption of Germany's building stock. Investments in the building sector have been far from sufficient, but have at least prevented worse. Without these measures, energy consumption and CO₂ emissions would probably even have increased. During the same period, energy prices were at a very low level¹⁶ and studies show that savings are also partly reduced by rebound effects.¹⁷

Claim 2: "The Federal Government is burning billions in public subsidies for renovation, with little to no effect for climate protection."

Fact: Between 2010 and 2020, the German government invested a total of almost **13 billion euros in subsidies under the CO₂ Building Renovation Program (CO₂-Gebäudesanierungsprogramm)**.² An evaluation study of the *Energieeffizient Sanieren* (focused on renovation) and *Energieeffizient Bauen* (focused on new construction), which are part of the CO₂ Building Renovation Program, has shown that these programs **saved an average of almost 700,000 tons of CO₂ per year** between 2010 and 2020.^{18,19}

However, these funds could be even used more effectively:

- The CO₂ Building Renovation Program by the *Kreditanstalt für Wiederaufbau* (KfW) is the German government's main funding instrument to improve energy efficiency. Unfortunately, the monitoring of KfW subsidies is very intransparent, as the KfW subsidy report only states the share of new commitments, but not the share of subsidies broken down by KfW program and the efficiency standard reached after renovation. According to our own projections, based on the government's answer to a parliamentary inquiry, around 30% of the subsidies were used for new construction in 2019 and almost 60% in 2020, rather than being invested in the building stock which is in urgent need of renovation.^{19,20}
- According to these calculations, almost 70% of the subsidies for new construction finance the insufficient Efficiency House (EH) 55 standard. This standard is already common practice in constructing new buildings, can be achieved with very low additional costs, and is not sufficient to reach the German climate targets.^{19,21,22} **The EH 55 standard should be set as the minimum standard for new buildings in the Building Energy Act and since it is already the current state of the art, it does not receive additional funding to be applied in new buildings.**
- The **inefficiency of this distribution** becomes even clearer when considered that **new buildings (pre 2009) account for only 3% of the building stock, but almost 60% of the funding in the CO₂ Building Renovation Program is spent for new buildings rather than renovations.** The major challenge, however, lies in the renovation of the existing building stock, which received only about 40% of the funds

¹⁶ Bundesministerium für Wirtschaft und Energie (2020): Gesamtausgabe der Energiedaten – Datensammlung des BMWi, <https://www.bmwi.de/Redaktion/DE/Artikel/Energie/energiedaten-gesamtausgabe.html>

¹⁷ Umweltbundesamt (2015): Rebound-Effekte: Ihre Bedeutung für die Umweltpolitik, <http://www.umweltbundesamt.de/publikationen/rebound-effekte-ihrebedeutung-fuer-die>, p. 83f.

¹⁸ Calculation on basis Institut Wohnen und Umwelt GmbH (2018): Monitoring der KfW-Programme „Energieeffizient Sanieren“ und „Energieeffizient Bauen“ 2017, <https://www.kfw.de/PDF/Download-Center/Konzernthemen/Research/PDF-Dokumente-alle-Evaluationen/Monitoring-der-KfW-Programme-EBS-2017.pdf> &

¹⁹ Calculation on basis Deutscher Bundestag Drucksache 19/26011 (2020) Antwort auf kleine Anfrage der Abgeordneten Dr. Julia Verlinden, Christian Kühn (Tübingen), Britta Haßelmann, weiterer Abgeordneter und der Fraktion BÜNDNIS 90/Die GRÜNEN Betr.: Wirksamkeit der Fördermittel im Gebäudebereich für den Klimaschutz, <https://dip21.bundestag.de/dip21/btd/19/260/1926011.pdf>

²⁰ KfW Bankengruppe (2020): Förderreport KfW Bankengruppe, https://www.kfw.de/PDF/Unternehmen/Zahlen-und-Fakten/KfW-auf-einen-Blick/F%C3%B6rderreport/KfW-F%C3%B6rderreport_2020.pdf

²¹ Kurzgutachten zur Aktualisierung und Fortschreibung der vorliegenden Wirtschaftlichkeitsuntersuchung sowie zu Flexibilisierungsoptionen. Leistungsabruf durch BMWi, Referat IIC2

²² Öko-Zentrum NRW (2020): Kurzstudie: Ermittlung von Mehrkosten zur Einführung eines „KfW-Effizienzhaus-Standards 55“ für alle Neubauten von Wohngebäude.

available in the CO₂ Building Renovation Program. This is far from sufficient to meet achieve a climate-neutral building stock, which is the government's declared goal.

Conclusion:

A massive misallocation of public subsidies generates windfall profits for the building industry, rather than contributing significantly to the ambitious renovation of the building stock. The EH 55 standard for new buildings, which is already common practice in the industry, has been heavily subsidized for years. It would make more sense to set the EH 55 standard as the required minimum standard for existing buildings through regulation. The subsidies for deep energy renovations of existing buildings should be increased massively.

Claim 3 "The 'obsession with insulation' needs to be stopped – instead, sufficient CO₂ savings in the building sector can be achieved through the use of renewable energy in the heat supply."

Fact: The final energy consumption of the building sector amounted to around 828 TWh in 2018. Only about **14% of this was covered by renewable energy.**⁶ To achieve a climate-neutral building stock, the final energy consumption of buildings must be reduced considerably so that the remaining heat demand can be covered by renewable energy.

- Between 2008 and 2019, the final energy consumption in buildings has fallen by only 10%.²³ According to a report commissioned by the Economy Ministry, final energy consumption of the building sector could be reduced by half by 2050 (from approx. 970 TWh to 440 TWh) compared to the base year 2008, if higher standards are applied.⁶
- All sectors must contribute to achieving the climate targets. **Renewable energy for heating, i.e. renewable electricity available for heat pumps, will likely remain a scarce commodity** due to increasing demand through sector coupling, e-mobility and industry decarbonization. These competing uses pose considerable restrictions for the use of renewables in heating. Accordingly, the "Efficiency First" principle must be given the highest priority.
- **Increasing energy efficiency in the building sector also benefits the economy more broadly** and can significantly reduce the expenditure for energy generation and distribution.²⁴

Conclusion:

The energy demand of buildings cannot be covered by renewable energy at the current level. Renewable energy will not be available in unlimited quantities – and there is high demand in other sectors. Therefore, a drastic reduction of the energy demand of buildings is absolutely necessary to reduce the dependence on energy imports and to ensure sufficient renewable energy is available for use in other sectors.

²³ BMWi (2021) Achter Monitoring-Bericht "Energie der Zukunft", <https://www.bmwi.de/Redaktion/DE/Publikationen/Energie/achter-monitoring-bericht-energie-der-zukunft.html>

²⁴ Agora Energiewende (2018): Wert der Effizienz im Gebäudesektor in Zeiten der Sektorenkopplung, https://static.agora-energiewende.de/fileadmin2/Projekte/2017/Heat_System_Benefit/143_Heat_System_benefits_WEB.pdf

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