Germany - Rural Energy Data

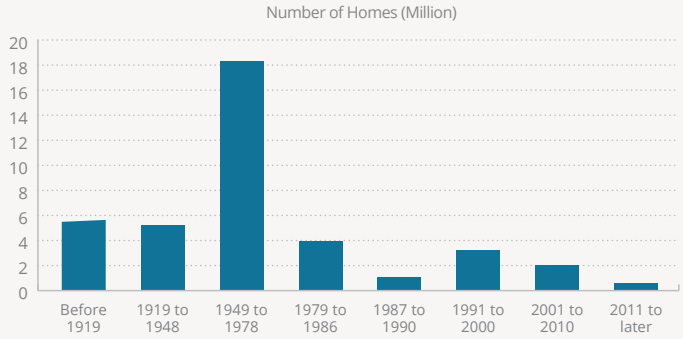
114 million people live in rural areas across Europe. These communities matter and need to be understood. To deliver a just energy transition, policy should reflect conditions in rural areas. However, data is often difficult to find.

This series of country-profiles provides the reader with an accessible overview of the key rural energy challenges in selected EU member states and brings together important datapoints in an accessible review.

Rural Energy Matters

- **The German rural building stock is old.** 73% of the total building stock was built before 1978, and rural homes have a far higher energy demand.
- **Heating oil is still widely used.** 25% of homes' final energy consumption for heating is attributable to heating oil. This is likely to be dominant in rural areas, creating higher emissions and air pollution levels.
- **Rural air quality is a problem.** Around half of rural air quality measurement stations reported particulate matter emissions above WHO guideline levels. Air quality is not just an urban issue in Germany

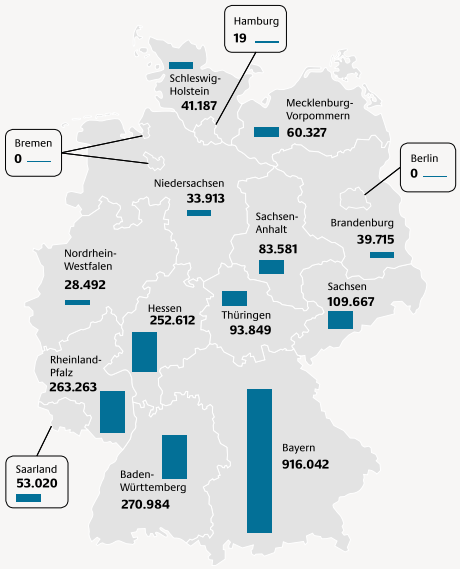
AGE BREAKDOWN OF GERMAN BUILDINGS



- German homes were typically built between 1949-1978. With around 73% of the building stock being built before 1978, the German building stock is old.
- Given that new build energy standards were only introduced from 1976 (energy saving law), these older properties are likely to be energy inefficient.
- Rural homes tend to be older and larger than average. This typically means a greater energy demand and more emissions as a result. Typical rural single-family homes built between 1949-1978 have a heating demand of around 50 kWh/m² higher than the multi-family home equivalents.
- Energy standards for new buildings were only introduced after the Energy Savings Act was issued in 1976.

Source: Destatis, BPIE and BBSR

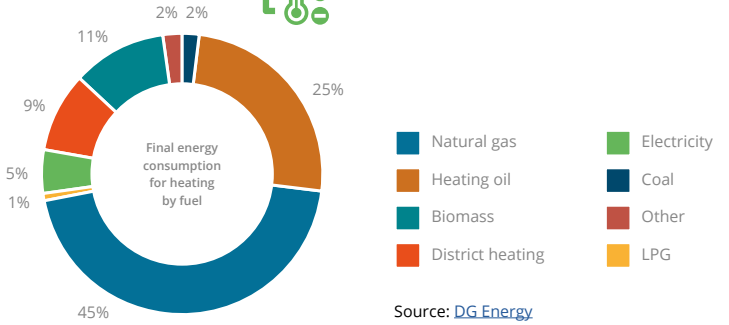
THE SCALE OF THE RURAL HEAT DECARBONISATION CHALLENGE



- 5.6% of buildings in Germany are not connected to the gas grid. These properties could achieve CO_2 and particulate matter savings by switching to cleaner fuels.
- The graph illustrates the estimated number of buildings located off the gas-grid in Federal States in Germany.

Source: Calculations based on Dena

FINAL ENERGY CONSUMPTION FOR HEATING BY FUEL



Source: DG Energy

The majority of final energy consumption for heating in Germany is derived from natural gas (45%) and heating oil (25%).

In rural areas, off the gas-grid, the consumption of heating oil is proportionately very high.

Germany targets an 80% reduction in primary energy consumption from buildings by 2050 (from 2008 levels).

Greenhouse gases are to be cut (compared to 1990 levels) by 40% by 2020, 55% by 2030, up to 95% by 2050.

A FREE (Future of Rural Energy in Europe) report with data provided by Ecuity Consulting and supported by SHV Energy

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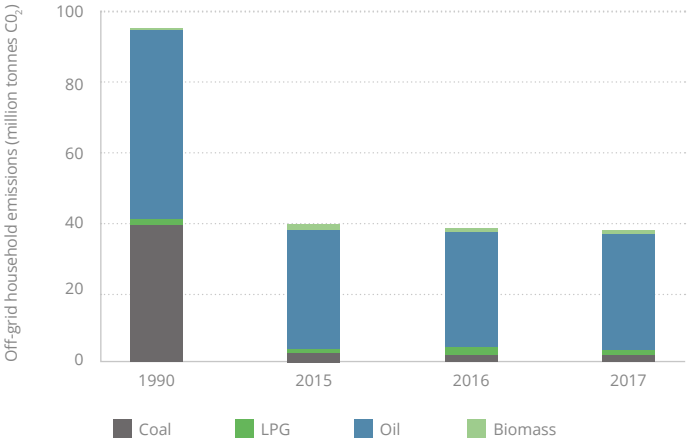
RURAL HOUSEHOLD CO_2 EMISSIONS TRAJECTORY

Off-grid household emissions have fallen over time



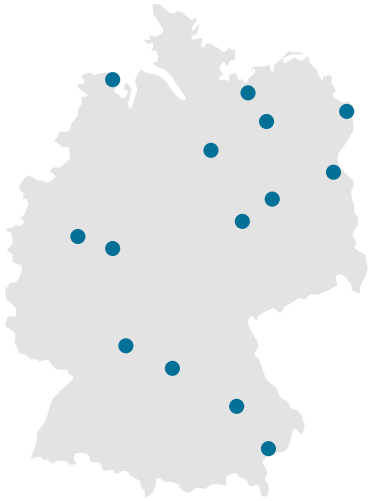
- Off-grid household co_2 emissions from rural fuel* consumption have fallen by 60% since 1990 (see chart above) but have remained broadly flat since 2015. Transitioning away from heating oil consumption will be necessary to reduce rural emissions further.
- Per capita emissions are at 11.4 tCO_2e, which is down 12% from 2000 levels (12.9 tCO_2e). However, over the past few years emissions remain stable.

Source: Eurostat energy balance data, GHG emissions, emissions per capita
* here defined as heating oil, coal, LPG and biomass

RURAL AIR QUALITY CHALLENGES

Some rural areas also have air quality problems

Map of rural air quality stations reporting $PM_{2.5}$ emissions above WHO guidelines in 2017



- In the EU, fine particulate matter ($PM_{2.5}$) exposure has been estimated to reduce life expectancy by more than 8 months. These fine particles can enter human bloodstreams and have a significant negative impact on health.
- 47% of rural air quality monitoring stations reported $PM_{2.5}$ background emission levels in exceedance of WHO guidelines in 2017 (emission limits of 10 µg/m3 per calendar year).

Source: European Environment Agency

RURAL ENERGY MATTERS

Rural communities are often not connected to the natural gas grid. Indeed nearly 40 million people do not have access to the gas grid, approximately 55% of the population.

Decarbonising heat will be necessary if Germany is to meet its climate change targets. To do this in a just and effective way, policymakers need to balance emission reduction, air quality and energy affordability challenges, all of which impact Germany's rural communities.

Source: Calculations based on Dena

The Future of Rural Energy in Europe (FREE) initiative was created by SHV Energy in 2010 to promote the use of sustainable energy within rural communities. FREE is supported by a variety of stakeholder groups, together giving a voice to all those who believe that rural energy needs are important, and aiming to add new perspectives to the EU's energy and climate debate. Identifying untapped potential in Europe's rural areas to decarbonise and improve air quality in a cost-effective manner. Filling in rural energy data gaps. Engaging and supporting rural communities is essential if government energy, climate and environment policies are to be realised.