

11 million people live in rural areas across the UK, with 15% of the population in off-grid homes. These communities matter and need to be understood. To deliver a just energy transition, policy should reflect the conditions of communities living in rural areas. However, data are often incomplete. Most data cover the UK, however some is specific to England, which represents around 85% of the UK's population.

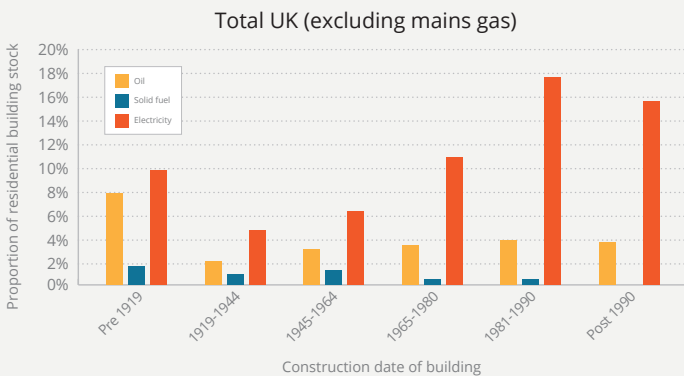
This series of country-profiles provides the reader with an accessible overview of the key rural energy challenges in selected European countries and brings together important datapoints in an accessible review.

Rural Energy Matters

- **The UK building stock is old and poorly insulated.** The UK has the oldest housing in Europe. Over 60% of homes were built before the first thermal regulations (built before 1970). Older properties are more commonly heated with oil and solid fuel.
- **Energy poverty is a problem.** Over 10% of rural homes are unable to afford their energy bills. In England, 15.9% of off-grid homes are fuel poor.
- **Off-grid heating is carbon-intensive.** Around 1.3 million (31%) off-grid homes in England use oil and coal for heating.



AGE BREAKDOWN OF UK BUILDINGS

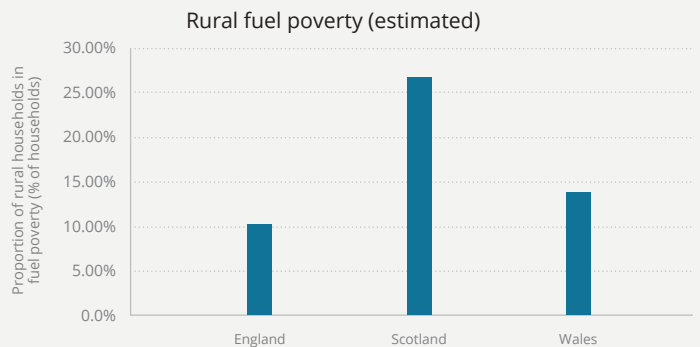


- Off-grid homes in the UK are heated with heating oil (55%), electricity (18%), solid fuel (11%) and LPG (10%).
- In England, older properties are more commonly heated with oil and solid fuel.
- The UK has an old building stock with most homes (~75%) built before 1980.
- Over 60% of homes were built before the first thermal regulations (built before 1970).
- Older homes are typically less energy efficient and have higher fuel bills relative to modern homes.

Source: [EHS](#), [SHCS](#), [VOA](#), [WHCS](#), and [FREE](#)



ENERGY POVERTY IN UK RURAL AREAS

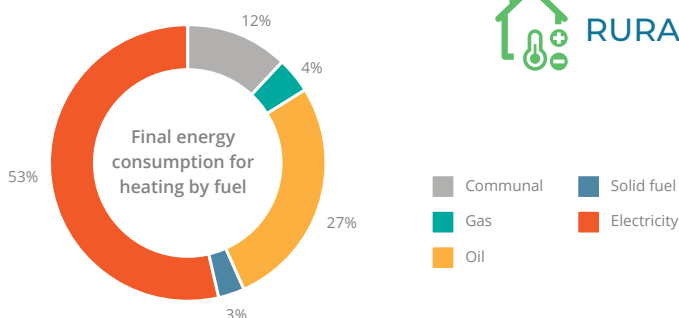


- Differences in methodology means there is no official estimate of fuel poverty for the UK.
- Around 10% (estimated) of rural households in England are classed as fuel poor.
- Of English households living in properties off the gas grid, 15.9% are fuel poor (including urban off-grid) compared to 10.1% on the gas grid. (Rural off-grid data fuel poverty is unavailable)

Source: [BEIS](#), [HoC](#)



RURAL HEAT DEMAND



Source: [EHS](#) and [Ofgem](#)

The majority of off-grid (including both rural and urban) homes in England are heated with electricity (53%), equating to around 2.2 million homes.

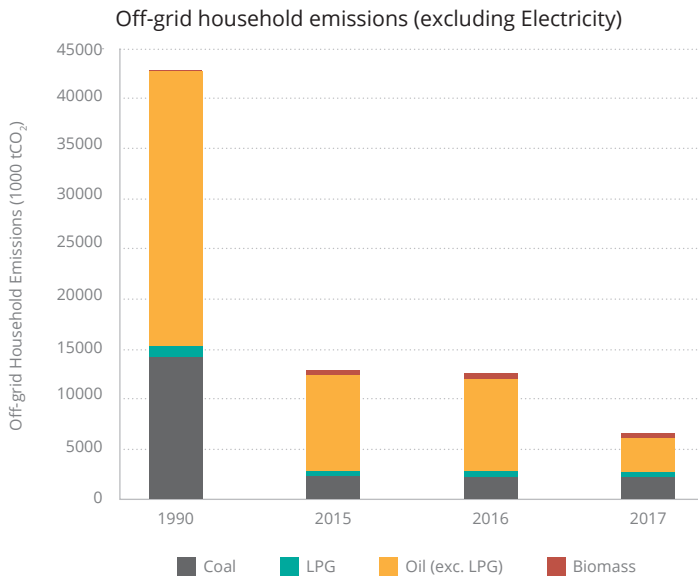
Following this, around 1.1 million homes use oil for heating (27%). Heating oil is carbon intensive and generates high levels of NO_x, SO_x and particulates relative to natural gas. It is more commonly used to heat homes in off-grid rural areas. (Rural properties have a higher incidence of being off the gas grid).

A further 200,000 homes use solid fuel for heating.



UK - Rural Energy Data

CO₂ RURAL CO₂ EMISSIONS TRAJECTORY



- CO₂ emissions from rural fuel* consumption have fallen by 75% since 1990.
- Despite this fall, the use of high-carbon fuels such as oil and coal are still prevalent across much of the off-grid housing stock.
- Consumption of biomass and LPG is stable.
- The UK's greenhouse gas (GHG) emissions stand at 505 million tonnes (Mt) CO₂e. This is down 38% from 1990 emissions (810 MtCO₂e).
- Per capita emissions are at 7.7 tCO₂e, which is down 39% from 2000 levels (12.6 tCO₂e). However, over the past few years emissions have remained stable.

Sources: [Eurostat](#) energy balance data, GHG emissions, emissions per capita
* here defined as heating oil, coal, LPG and biomass

RURAL AIR QUALITY CHALLENGES

Some air quality stations in the UK reported PM emission levels above WHO guidelines

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



- In the UK, air pollution is attributed to around 28,000 to 36,000 premature deaths a year.
- PM_{2.5} emissions caused total economic damage costs of €4.4 billion (estimated) in 2017.
- 1 in 3 (33%) rural air quality monitoring stations reported PM_{2.5} background emission levels above WHO guidelines in 2017 (emission limits of 10 µg/m₃ per calendar year).

Source: [European Environment Agency](#), [WHO](#) and [OECD](#) and [Public Health England](#)

RURAL ENERGY MATTERS

Rural areas account for 17% of the UK's population. These rural communities are often not connected to the natural gas grid. Indeed, 15% of total households in the UK are off-grid. As a substitute, heating oil is widely consumed for heating purposes.

Decarbonising heat is necessary if the UK 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 the UK's rural communities.



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.