

UNITED KINGDOM

Case study: residential heating
#BeyondTheGasGrid

~2.0 million rural homes are not connected to the gas grid

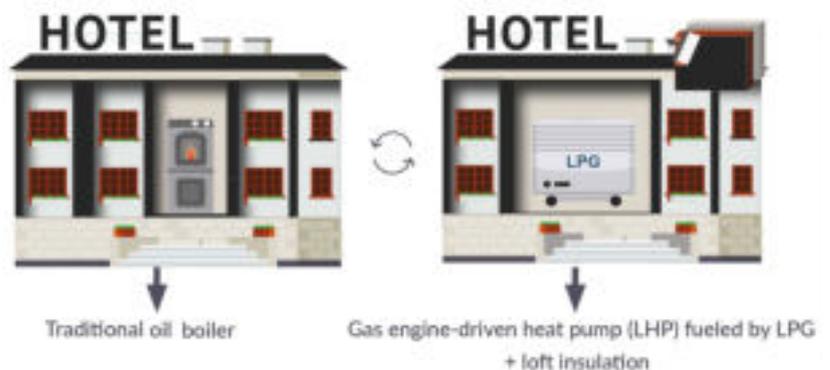
55% of rural homes use heating oil for heating

10,000's rural hotels use heating oil for heating

36,000 deaths/year are attributed to air pollution in the UK

In England's rural areas, heating oil is typically used to heat homes and hotels. Using it produces high levels of greenhouse gas emissions and significantly worsens air quality. Many rural hotels are typically very energy inefficient with a low level of thermal insulation.

This analysis considers the monetary and health benefits of a rural hotel (built before 1918) switching from using an old oil boiler to a new condensing LPG boiler. The hotel also installs loft insulation to increase the energy efficiency of the hotel.



LPG annual CO2 savings: 35%
BioLPG annual CO2 savings: 82%

56% NOx emissions savings

85% Lifetime PM emissions savings

€819 Annual energy bill savings

Capital cost payback = 6 years

From 2030 onwards, it is assumed that the boiler is fuelled by bioLPG.

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Alternative technology options available:

The table below compares how alternative technology options compare to an existing oil boiler. The different heating systems include a new LPG boiler, an air source heat pump and a biomass boiler.

 performs worse than old oil boiler

 performs better than old oil boiler

Technology Options	Upfront cost*	Running cost	Lifetime CO ₂ reduction	Lifetime air pollution reduction
LPG boiler: <i>New, condensing</i>	Similar to oil boiler	Slightly lower than oil boiler assuming that efficiency improvements are achieved	Lower than current oil boiler (up to 40% using LPG, up to 90% using bioLPG)	Substantially lower than current oil boiler (up to 60%)
Air Source Heat Pump	4-5 times more expensive than an oil boiler	Lower than oil boiler due to efficiency improvements	Substantially lower than current oil boiler (more than 90%)	Substantially lower than current oil boiler (up to 99%)
Biomass boiler: <i>New, automatic (Pellet or log fuelled)</i>	7-8 times more expensive than an oil boiler	Potentially higher than oil. Dependent on wood type (pellet or logs).	Substantially lower than current oil boiler (more than 90%)	Substantially higher than current oil boiler. PM emissions are higher irrespective of wood type (more than 1000%)

*Upfront cost differences are case-specific; in this case the upfront cost for a heating system is modelled for an energy demand of 100MWh/annual.

Sources: UK Business, Energy and Industrial Strategy (BEIS), Fraunhofer ISI, Building Research Establishment (BRE), European Environment Agency (EEA), VHK, Standard Assessment Procedure (SAP) and Liquid Gas UK.



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