

Decarbonising a family home in Rural Northern Ireland.



Liquid Gas UK



**Detached house
Pre 1900**
(representative of up to 36% of N.Ireland housing stock),

Floor area:
106m

No major renovations
Solid walls & uninsulated

Energy needed for heating:

161 kWh/m²* year
(17,066 kWh/year)

Northern Ireland has a high proportion of properties which aren't connected to the main gas grid and only 24% using the main gas network.

This means that oil boilers are the most widely used method for heating homes and replacing these boilers will significantly reduce carbon emissions – the question is which technology is best.

Many of the low carbon alternatives available come at a high cost, whether that comes from the up-front cost of purchase or installation, or the costs associated with retrofitting properties in order to make them more energy efficient.

LPG is lower carbon than oil, immediately saving up to 20% emissions. It is also clean burning, with low levels of NO_x, SO_x and particulate matter. For this particular home, a switch onto LPG and a transition to bioLPG provides the most cost effective solution to decarbonise.

Cost Breakdown

Heating system	CapEx (£)	OpEx (£/yr) (2020)	Levelized Cost (£/MWh) (2020)	Carbon Emissions (kgCO ₂ e/yr) (2020)
Oil Boiler	3,950	1,041	73	6,262
Coal Boiler	5,962	1,115	86	8,752
LPG Boiler	1,900	1,680	97	4,439
bioLPG Boiler	1,900	1,982	113	1,008
ASHP	11,890	1,992	152	1,570
ASHP (+R) *	19,390	942	156	742
Hybrid	12,430	1,844	154	1,457
Hybrid (+R) *	20,870	983	174	735
Biomass Boiler	13,650	1,387	123	286

Can rural households in Northern Ireland afford this?

Heating system (CapEx)	Percentage of households who can afford this capital cost?
BioLPG Boiler (£1,900)	74%
ASHP (£11,890)	37%
Hybrid (£12,430)	35%
Biomass (£13,650)	33%
ASHP + R (£19,390)	14%

Analysis:

We know cost is an important consideration when making decisions about which heating methods to recommend. The lowest cost, low carbon, heating system is a bioLPG boiler at £1,900. All other recommended options carry a much higher up front cost making them an unviable option for many families.

The heating system with the lowest operational cost is the air source heat pump with renovations to improve fuel efficiency within the home, however the up-front cost of purchasing a heat pump and subsequent renovations makes it a costly option. **In fact just 14% of households in Northern Ireland can afford the costs of circa £19,390 to purchase and install an air source heat pump.**

The low capital cost of purchasing a bioLPG boiler, coupled with the levelized cost (average of the upfront and running costs) makes the bioLPG the most financially accessible option for this type of home with **74% of households in Northern Ireland could afford the cost of £1,900 for a bioLPG boiler.**

In addition to cost, there is also the consumer journey which needs to be taken into account - the amount of time required to organise the replacement of the old system and for the installation/renovation process for the new system.

The consumer journey for a switch to bioLPG is quick and easy, a process predicted to take 2.5 – 4.5 days maximum, this is considerably less than the time required by a household to switch to an air source heat pump with retrofit, which would take between 11 – 15 days.

Conclusion:

- **BioLPG Boilers** have a much lower up-front cost compared with heat pumps and biomass
- They offer a **low carbon solution** which meets Net Zero ambitions
- The **transition from oil to LPG is simple** - no renovations and large upfront sums of money required
- The **transition from LPG to bioLPG is seamless** as each product is chemically identical so can be mixed.

* This information has been taken from the Archetype Analysis work conducted by Ecuity Consulting comparing the suitability of heating methods between a variety of archetype properties in Northern Ireland. The full report can be found here: liquidgasuk.org/uploads/DOC6179319D59836.pdf

* Displays the approximate percentage of Northern Irish households that have an annual disposable income greater than the capital cost of each of the low carbon heating systems for a house of this archetype.