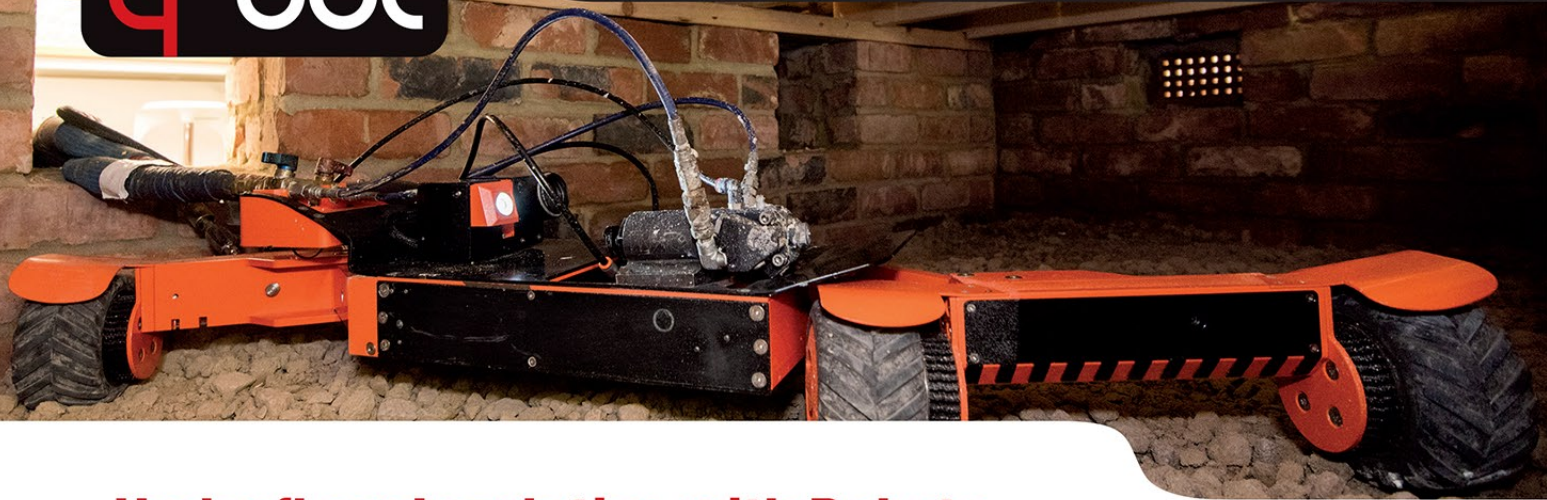


“It does feel warmer in here, it did immediately.”

Camden Resident



Underfloor Insulation with Robots: the most cost effective EPC upgrade

Q-Bot has developed an innovative system for reducing heat loss through suspended timber floors by applying insulation from underneath.

A robot is inserted into the floor void, surveys the void and condition of the floor, sprays insulation to the underside of the floor boards, and verifies the area and depth of insulation applied. This keeps the floor on the warm dry side, while maintaining ventilation within the floor void. Access can be made through an air vent in the outside wall, or through a small opening in the floor from within the property. This minimises disruption to residents and results in a typical install time of 1-2 days.

Positive impact on comfort

Results from trial sites show that spray applying insulation to suspended timber floors reduces the heat loss through the floor by an average of **85%**, reduces temperature stratification within the room, and reduces the draughts in the property by **40%**. This creates a warmer, more comfortable home, and reduces energy bills. In older, solid wall properties the service is often the most cost effective way of improving the EPC.

An impact assessment was conducted for typical ‘hard to treat’ properties by an independent assessor, in order to produce Energy Performance Certificates (EPC), using the Standard Assessment Procedure (SAP). The resulting energy rating can be used to compare Q-Bot’s floor insulation against the uninsulated baseline

and other energy efficiency measures. This information can be used to assess whether Q-Bot’s under floor insulation solution provides a good energy savings opportunity for different types of housing stock.

The most cost effective EPC upgrade

The results for the properties modelled show that Q-Bot insulation can save between **£140** and **£300** on annual energy bills, **0.5 to 1.3t CO₂ per year** and improve the **EPC by 4 to 9 points**.

Q-Bot compares favourably with double glazing and Solid Wall Insulation (SWI), with lower costs, payback period and cost of carbon abatement. With the exception of loft insulation, it is the most effective way to improve the EPC of older properties, even before

the cost implications of disruption are taken into account. There is no need for expenditure on removing furniture, storage, redecorating, or temporary accommodation making Q-Bot a highly attractive solution.



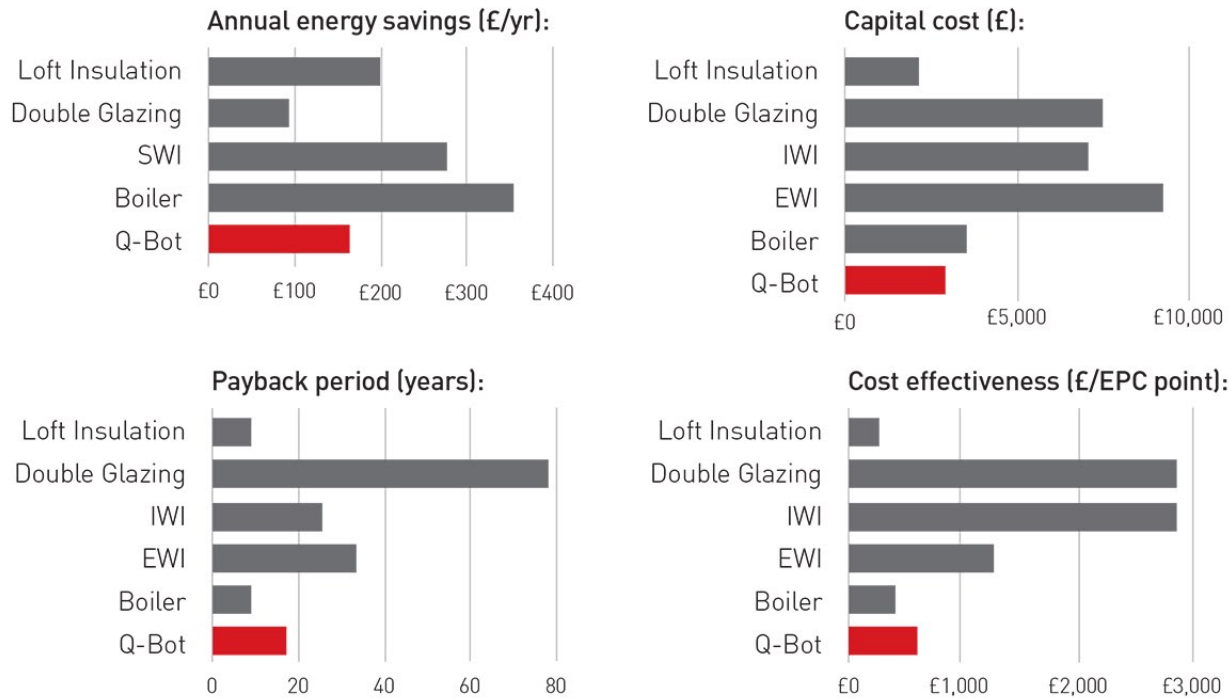
Supported by the European Union’s Horizon 2020 research and innovation programme.

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Examples of Energy Savings and Costs

Results for a Terraced House

For a terraced house Q-Bot offers energy savings for a lower upfront cost than all other measures except loft insulation. Q-Bot is 2 times more cost effective per EPC point than SWI and 4 times more cost effective than double glazing:



Results for a Flat

Ground floor flats allow for considerable energy and CO₂ savings when installing Q-Bot floor insulation. On average, savings of £200 annually with a payback period below 20 years can be achieved. Insulation by Q-Bot is on average two times more cost effective than SWI and the second most cost effective option available behind boiler replacement. Although boiler replacement shows a payback time of 14 years it is worth noting that its life expectancy is 12 compared to floor insulation of more than 40 years.

