www.q-bot.co
info@q-bot.co
+44 (0) 208 877 2709

Robots to the rescue.

8-12m houses with floors which can't be reliably, safely, and accountably insulated? Q-Bot has the solution.

Retrofitting your housing stock with underfloor insulation

Smart Housing (Birmingham) – May 17th

Martin Rinvolucri – Head of Partners

martin.rinvolucri@q-bot.co / 07467 852299

1. Introduction to Q-Bot

Q-Bot's vision:

Q-Bot's goal is to make it easier for contractors to **inspect**, **maintain** and **upgrade** buildings, in order to deliver **quality retrofits**.

Q-Bot's solutions combine robotics, 3D scanning, digital tools and AI, enabling contractors to:

- **identify** the needs of each property;
- **automate** repetitive tasks;
- **reach** inaccessible areas,
- **track** the work done; and,
- seamlessly **share** information.

2. Opportunity

>8m

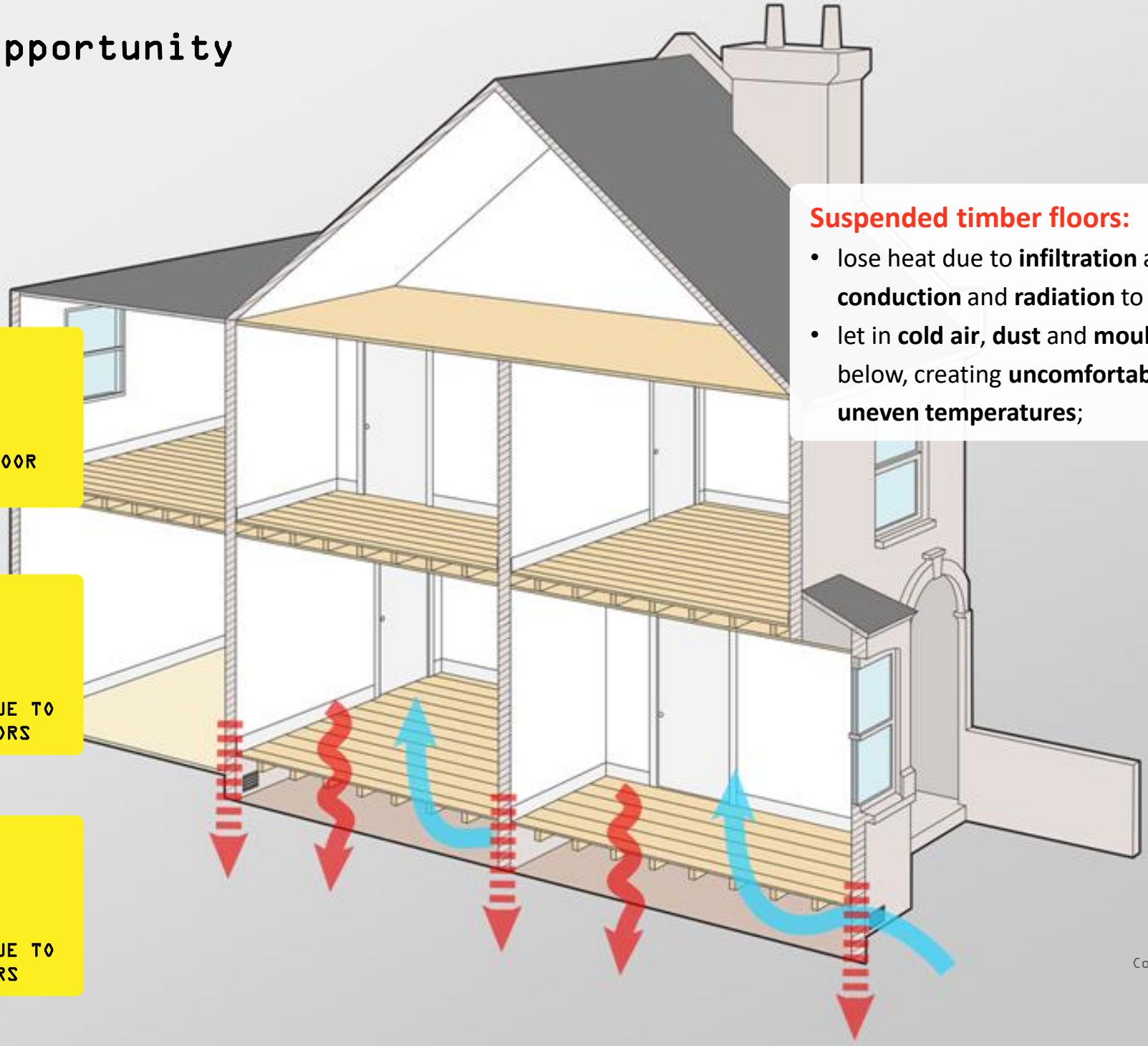
UK HOMES NEED FLOOR INSULATION

20%

OF HEAT LOSS IS DUE TO UNINSULATED FLOORS

1/3

OF DRAUGHTS ARE DUE TO SUSPENDED FLOORS



Suspended timber floors:

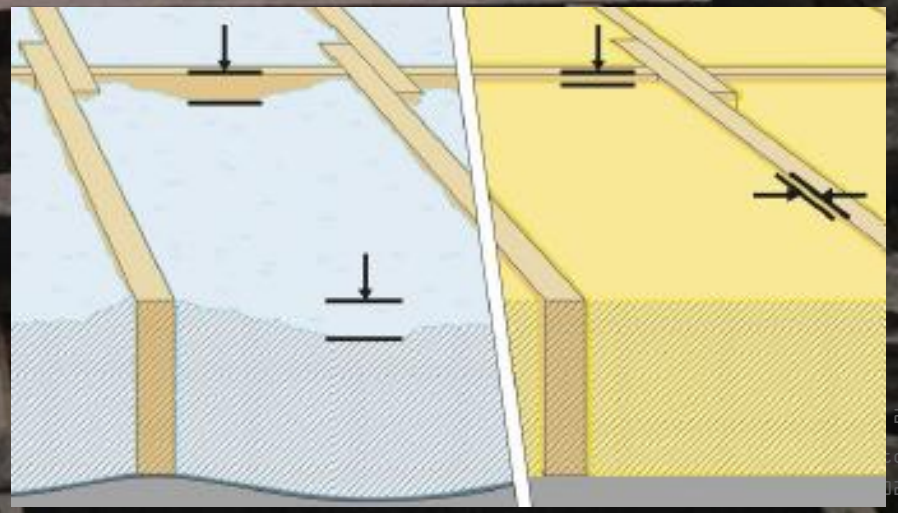
- lose heat due to **infiltration** as well as **conduction** and **radiation** to the ground below;
- let in **cold air**, **dust** and **mould** from the void below, creating **uncomfortable draughts** and **uneven temperatures**;

2. Opportunity

Traditional floor insulation methods are disruptive:

- **furniture**, **fixtures** and **carpets** are removed; **floorboards** are lifted;
- **insulation** is cut to shape by hand to fit the gaps;
- an **airtight membrane** is fitted and the joins taped; and,
- everything is put back together and the room **redecorated**.
- time-consuming and expensive (up to 2 weeks and £10k);
- has a long payback (>20 years);
- hugely disruptive to those living in the property; and,
- often performs poorly (difficult to fit and ensure air tightness).

Even small gaps of 1mm or less, can significantly impact performance resulting in lower energy savings than expected.



3. Insulation of suspended floors

Q-Bot's solution uses a robot to apply insulation

- Increase SAP score between 2-12 points
- Takes **1-2 days** to install and **minimises disruption**.
- Average install price is **£3,200** or **£500-£600 per SAP point**.
- Eligible 'Primary' measure for GHG-LAD, HUGs and other schemes for properties rate D, E, F & G.
- High **performance** and reduces the risk of **damp / mould**.
- Significantly reduces draughts **and improves comfort**

Insulation of suspended floors

Property analysis and filtering

- Collate available data sources
- API with EPC registry / Google / Client data
- Utilise machine learning algorithm

Address	Postcode	Build year	Current energy rating	Potential energy rating	Suspended timber floor (true/false)	% Suspended floor in Postcode Area	Average SAP score in Postcode Area
58 Sackville Road, Hove	BN3 3HA	1960	60	84	True	20.91	55.7
…	…	…	…	…	…	…	…

Client

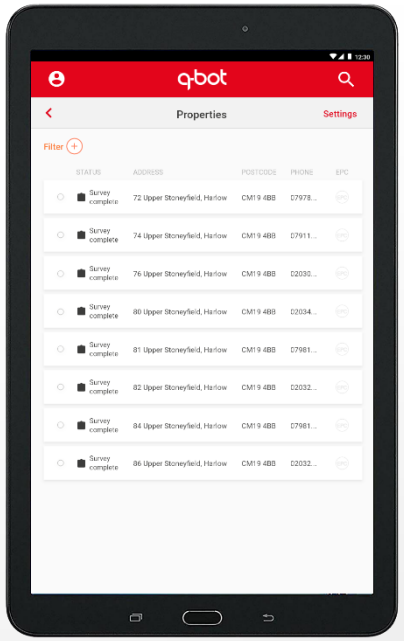
Q-Bot

Actionable outputs

- Current and expected energy performance data
- Build type and key characteristics
- Identify and target suitable properties for survey
- Plan and design scale of projects

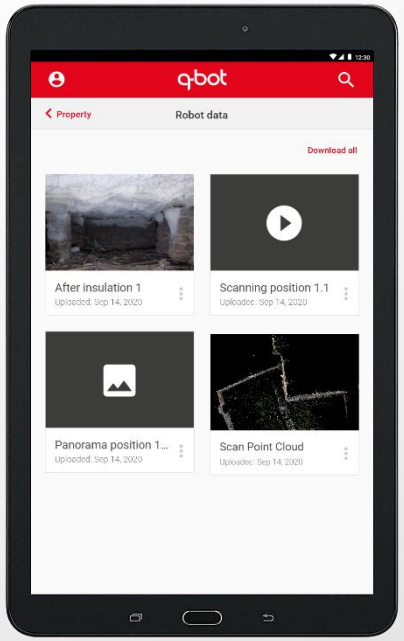
Insulation of suspended floors

Overview of the process:



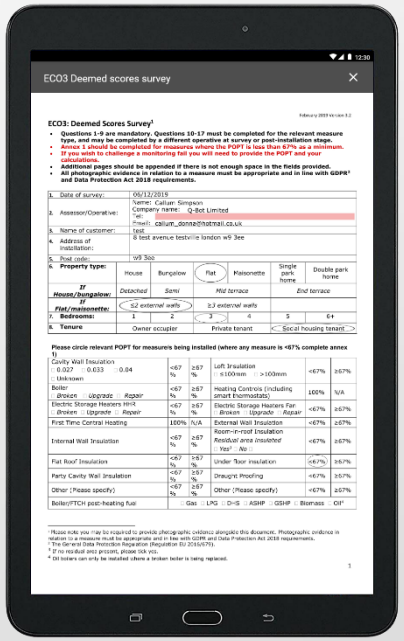
Technical Survey

- Technical and practical checks.
- Price and quote.



Installation

- Setup and preparation.
- Stage 1 – Access.
- Stage 2 – Pre install checks.
- Stage 3 – Application of insulation.
- Stage 4 – Post install checks.
- Make good.



Verification

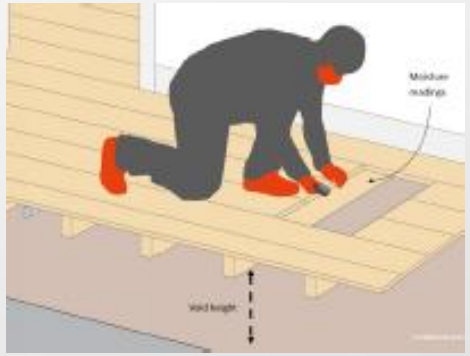
- Independent audit and checks.
- Issue Declaration of Conformity, etc.

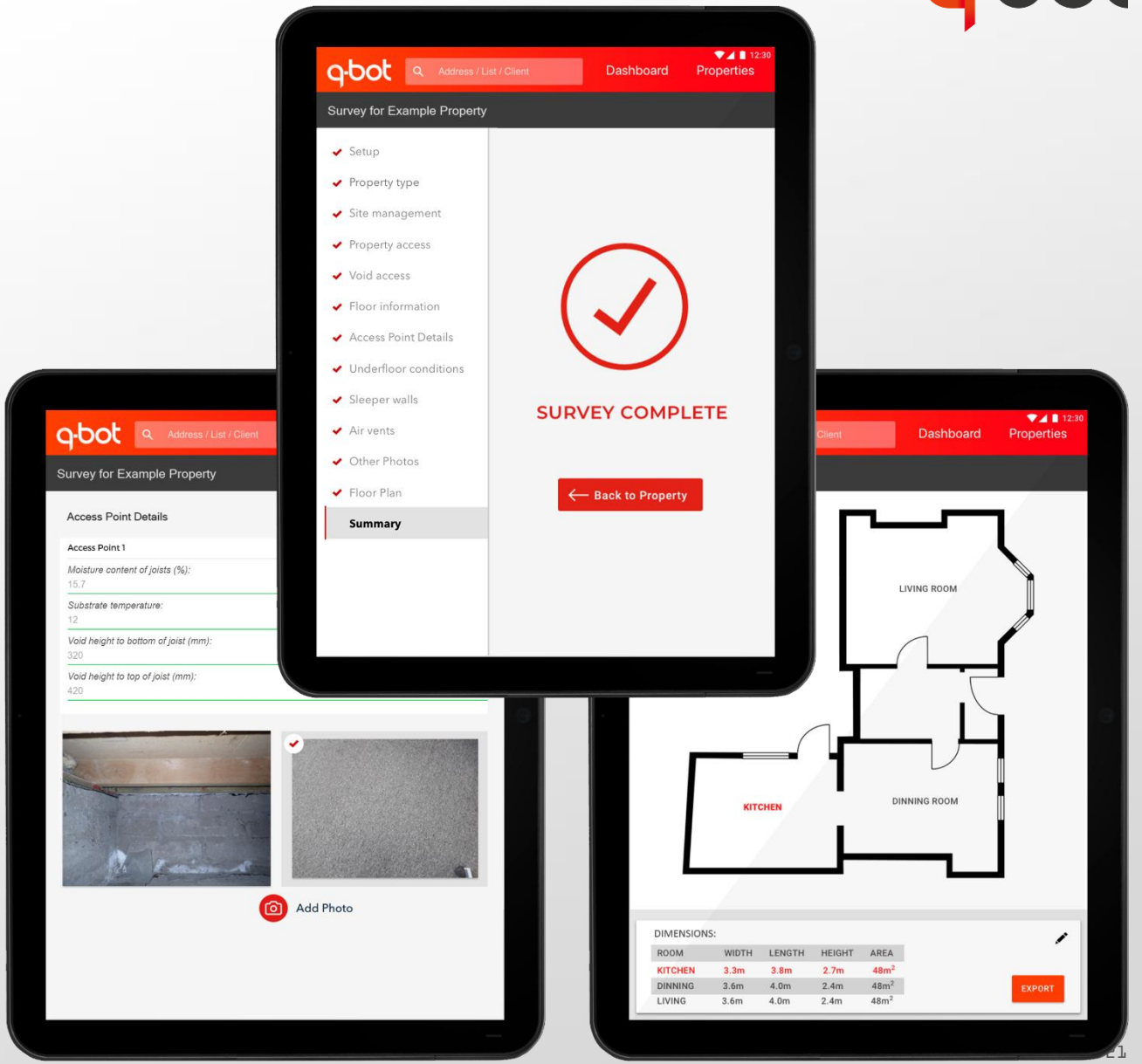
Insulation of suspended floors

Proactive risk management during the survey:

- The floor void is checked to ensure there are no underlying problems (e.g. a **leak** or **infestation**).
- **Moisture** readings are taken of the floor and joists.
- The number and location of **air vents** are checked.
- **Air vents** will be cleaned, replaced or even new ones added to ensure **adequate ventilation**.
- The location and condition of **services** are recorded and a **floorplan** created.

Any aspects that require further attention will be flagged with the client before the install proceeds.

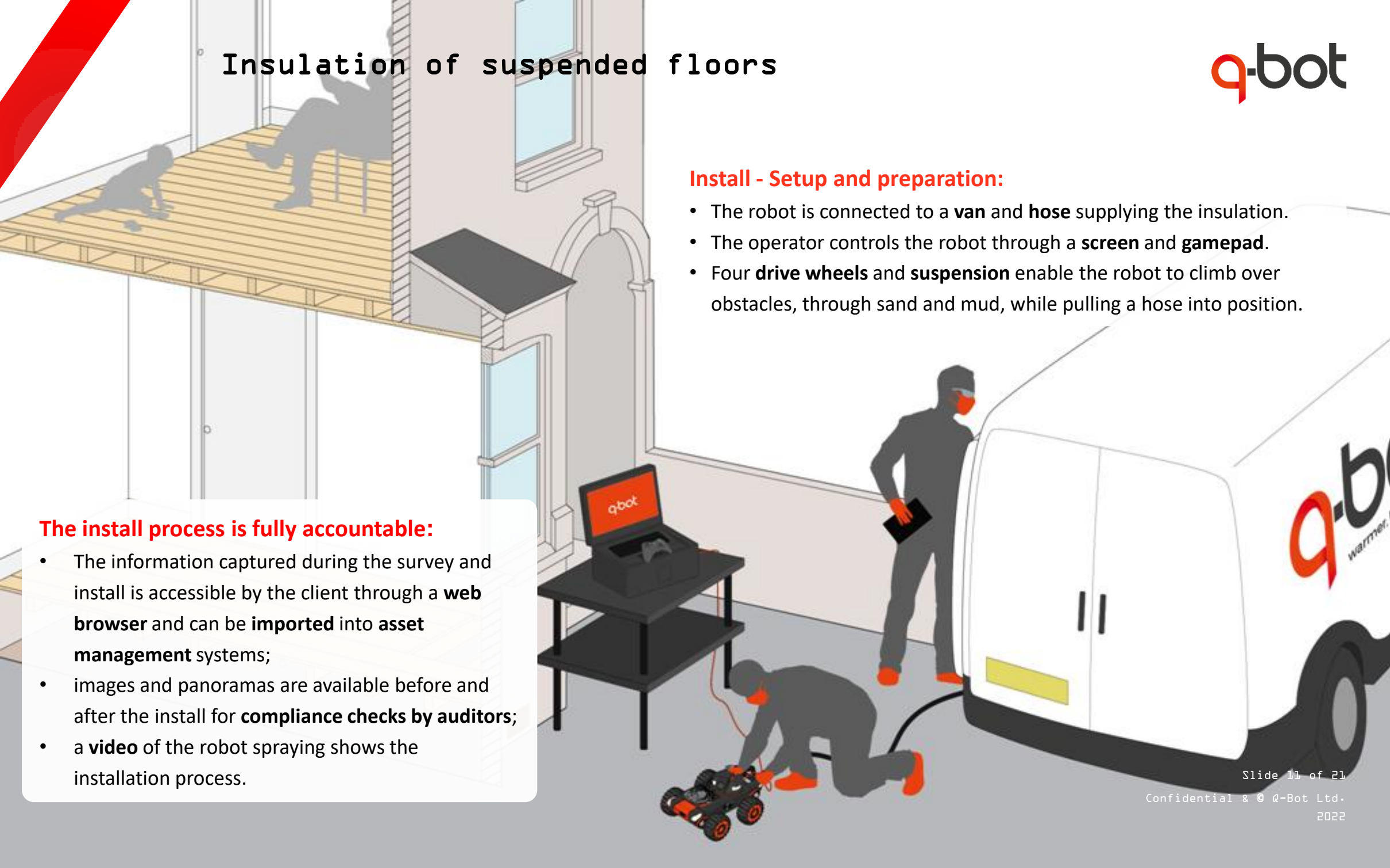




Insulation of suspended floors

Install - Setup and preparation:

- The robot is connected to a **van** and **hose** supplying the insulation.
- The operator controls the robot through a **screen** and **gamepad**.
- Four **drive wheels** and **suspension** enable the robot to climb over obstacles, through sand and mud, while pulling a hose into position.

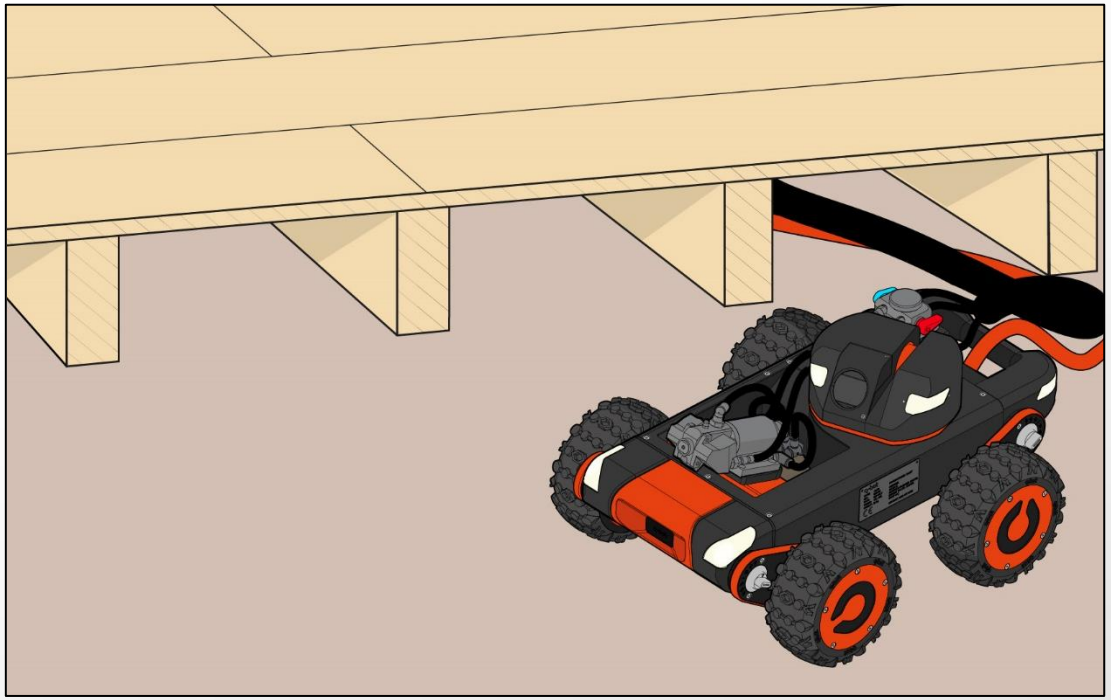


The install process is fully accountable:

- The information captured during the survey and install is accessible by the client through a **web browser** and can be **imported** into **asset management** systems;
- images and panoramas are available before and after the install for **compliance checks by auditors**;
- a **video** of the robot spraying shows the installation process.

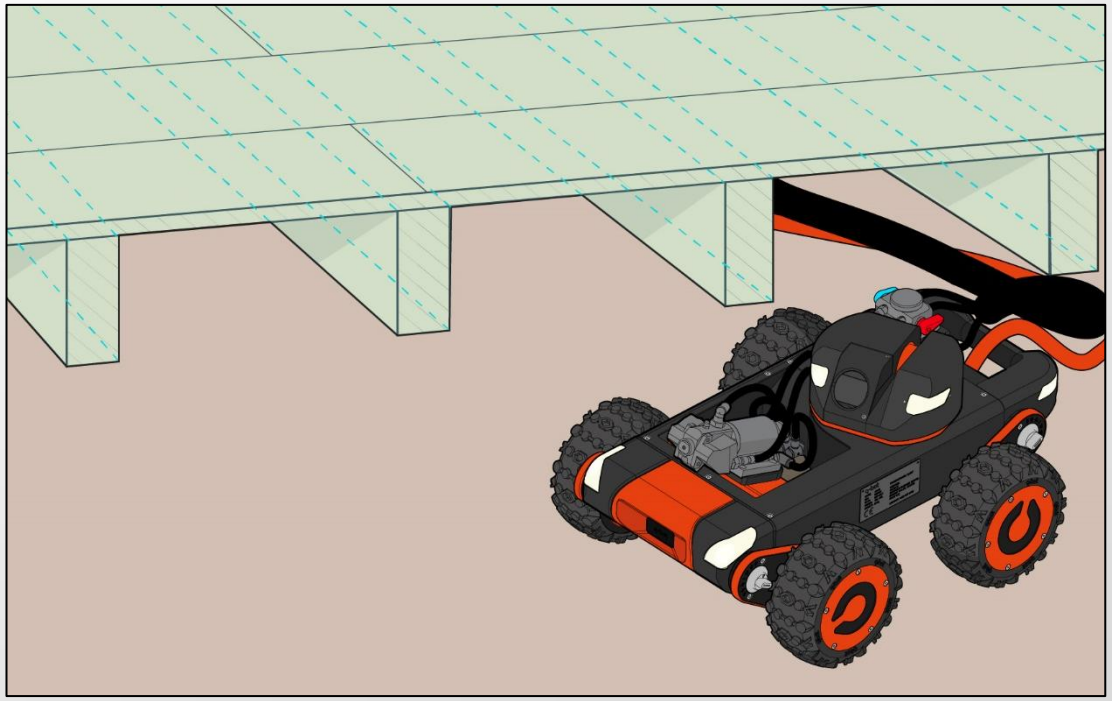
Insulation of suspended floors

Install Stage 1. Access



The robot is inserted into the void through an **access hatch** or **air vent**. This means an install can be completed in **1-2 days** without the property needing to be vacated or furniture moved.

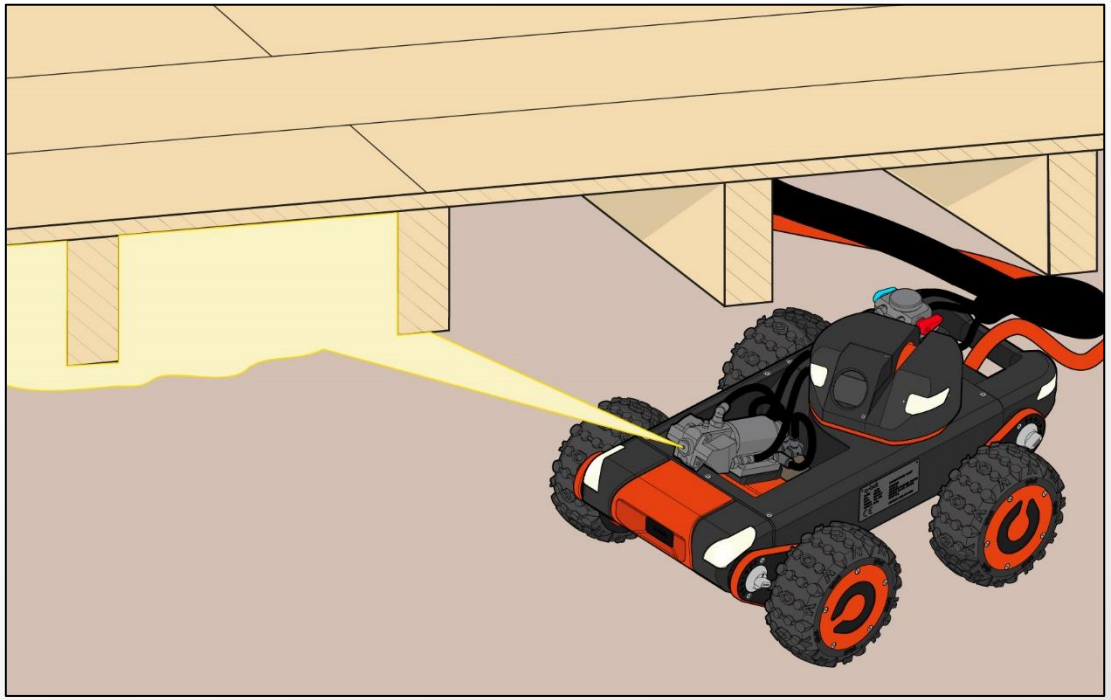
Install Stage 2. Pre Install Checks



As the robot travels along the void a detailed **3D map** is built of the underfloor space and services, allowing the operator to assess the property and **identify any risks** before the installation begins.

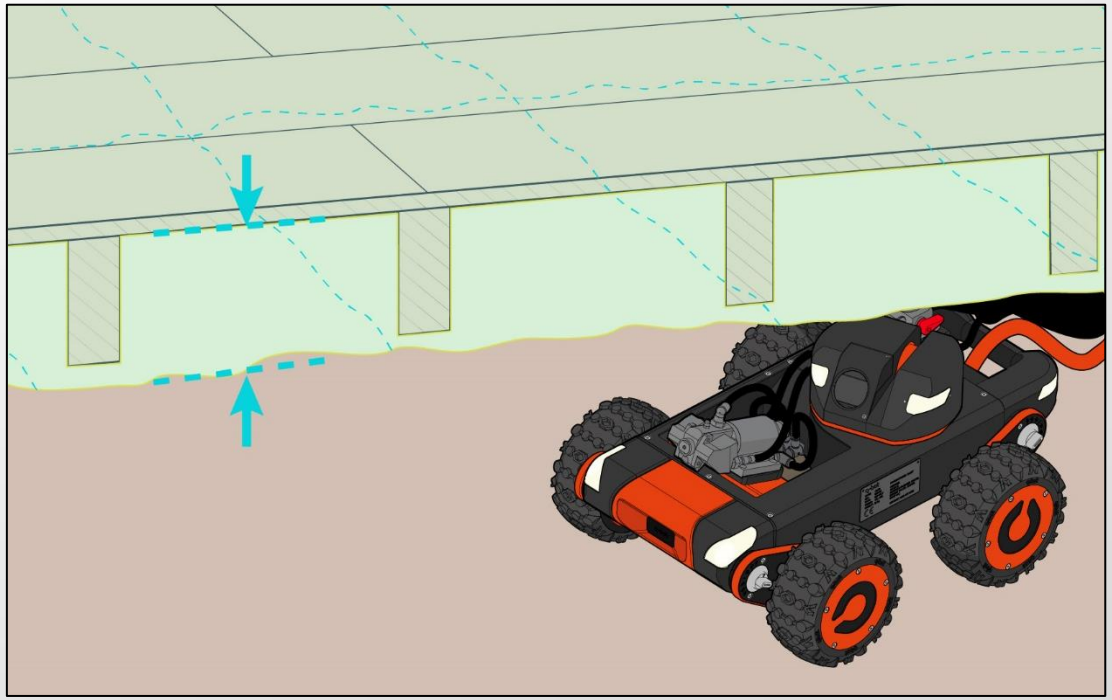
Insulation of suspended floors

Stage 3. Apply insulation



A **polyurethane insulation** is **spray applied** to the underside of the floorboards and **expands** to fill the gap. This keeps the floor on the warm, **dry side** and maintains the **ventilation** space for the ground.

Stage 4. Post install checks

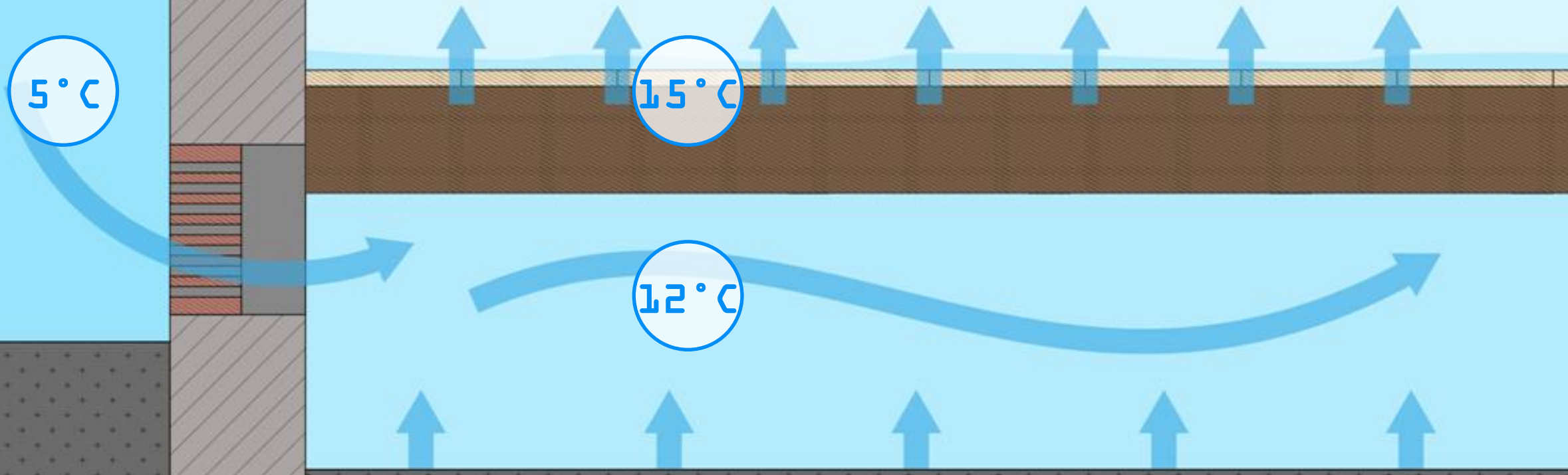


The installation is **continuously monitored** to **measure** the thickness of the insulation applied, creating a **record** of each install and allowing Q-Bot to **verify** that the work has been completed correctly.

4. Benefits of insulating the floor

Q-Bot's approach reduces the risk of damp and mould:

- the void between the floor and ground is **humid** and **cold**;
- **temperature** and **height** variations across a property create a **pressure difference** that drives air movement and heat loss;
- draughts bring **cold, moist air** from the void into the property.

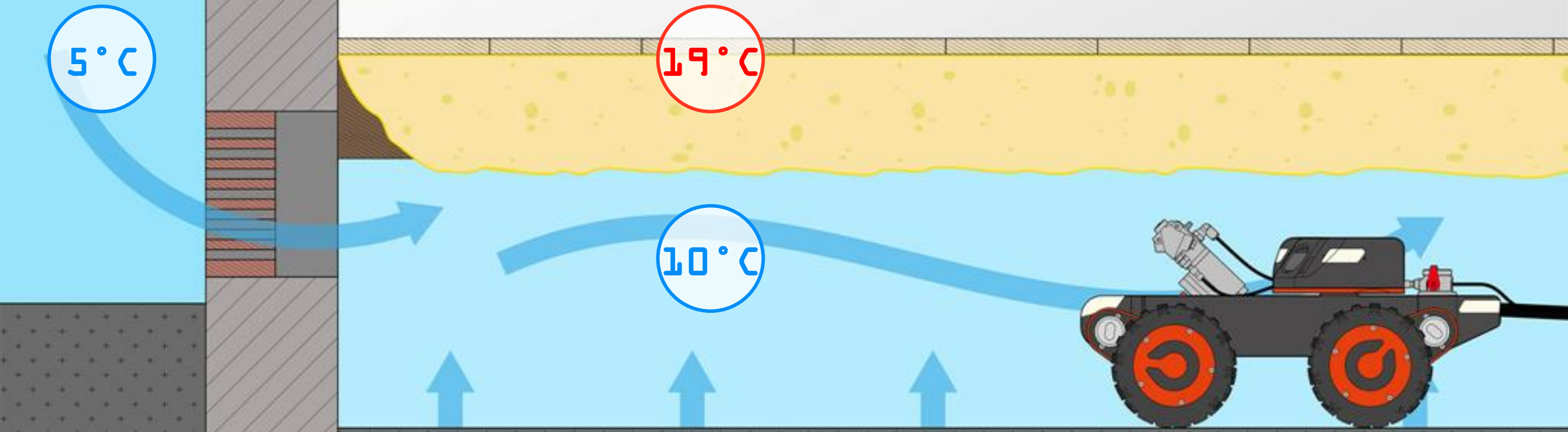


4.

Benefits of insulating the floor

Q-Bot's approach reduces the risk of damp and mould:

- The layer of polyurethane insulation creates a **hydrophobic barrier** between the floor and void. The insulation raises the temperature of the floor and reduces the risk of condensation.
- To reduce the risk of **thermal bridging** the depth of insulation is reduced around the joist and wall junction.
- **Air vents** will be cleaned, replaced, or even new ones fitted, to ensure adequate **ventilation** of the void.

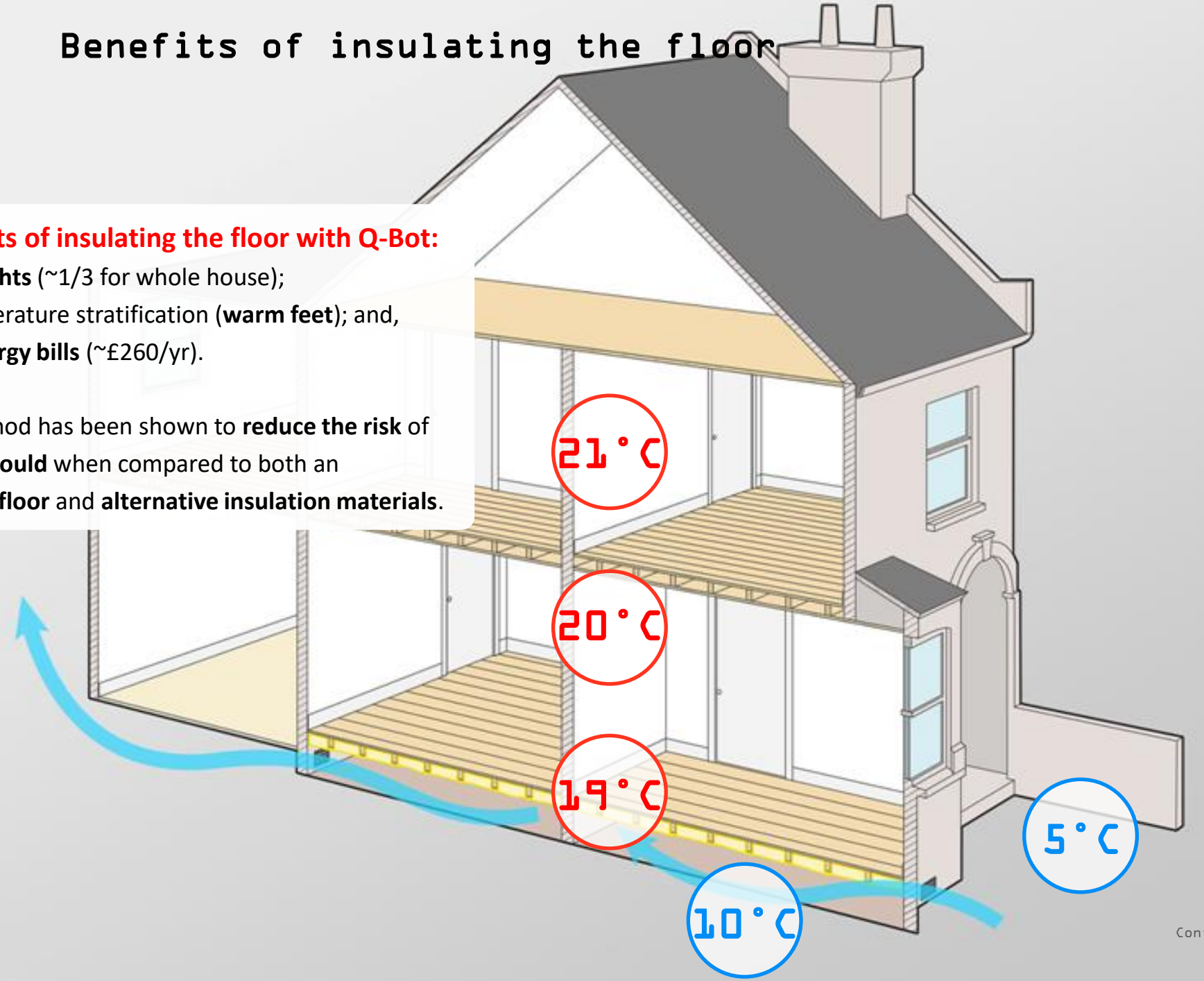


4. Benefits of insulating the floor

The benefits of insulating the floor with Q-Bot:

- less **draughts** (~1/3 for whole house);
- less temperature stratification (**warm feet**); and,
- lower **energy bills** (~£260/yr).

Q-Bot's method has been shown to **reduce the risk** of **damp** and **mould** when compared to both an **uninsulated floor** and **alternative insulation materials**.



5. Impact

1/3

REDUCTION IN DRAUGHTS

TYPICAL SAVINGS OF

£260/y

r

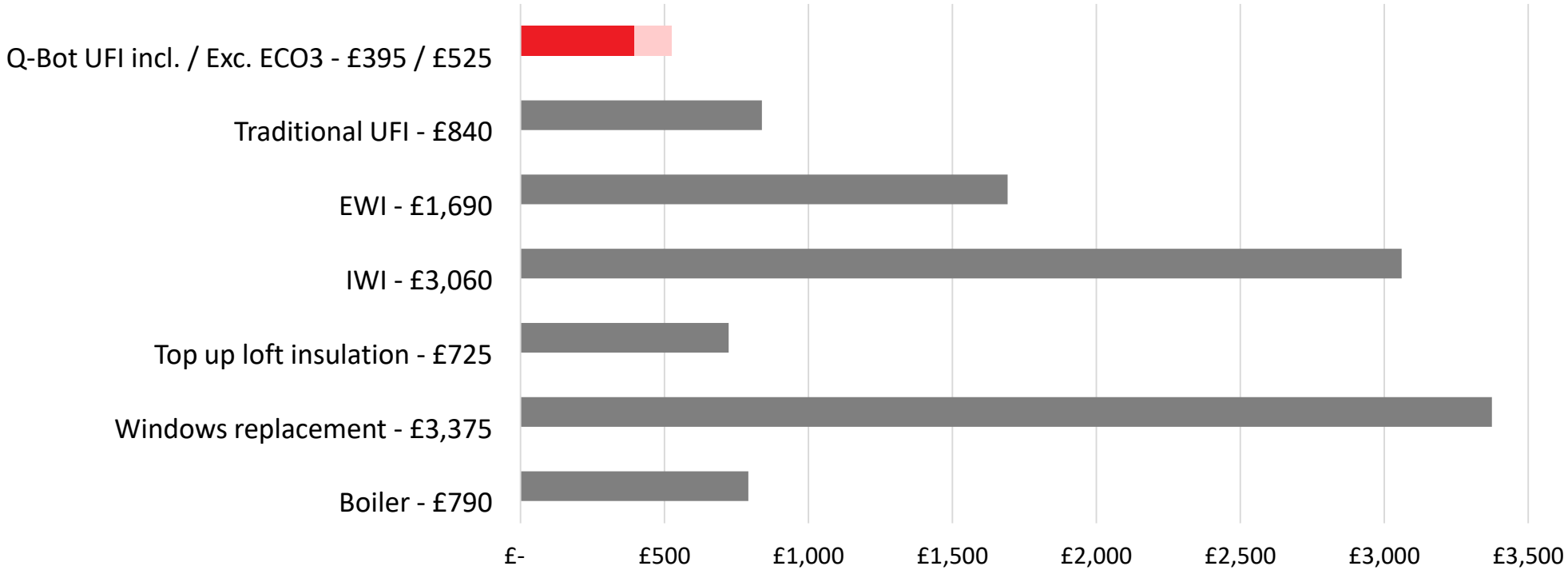
90%

REFERRAL RATE

*"I am much warmer, and I'm saving **£20** per month on bills. I love Q-Bot, it has made a massive difference."*

Impact

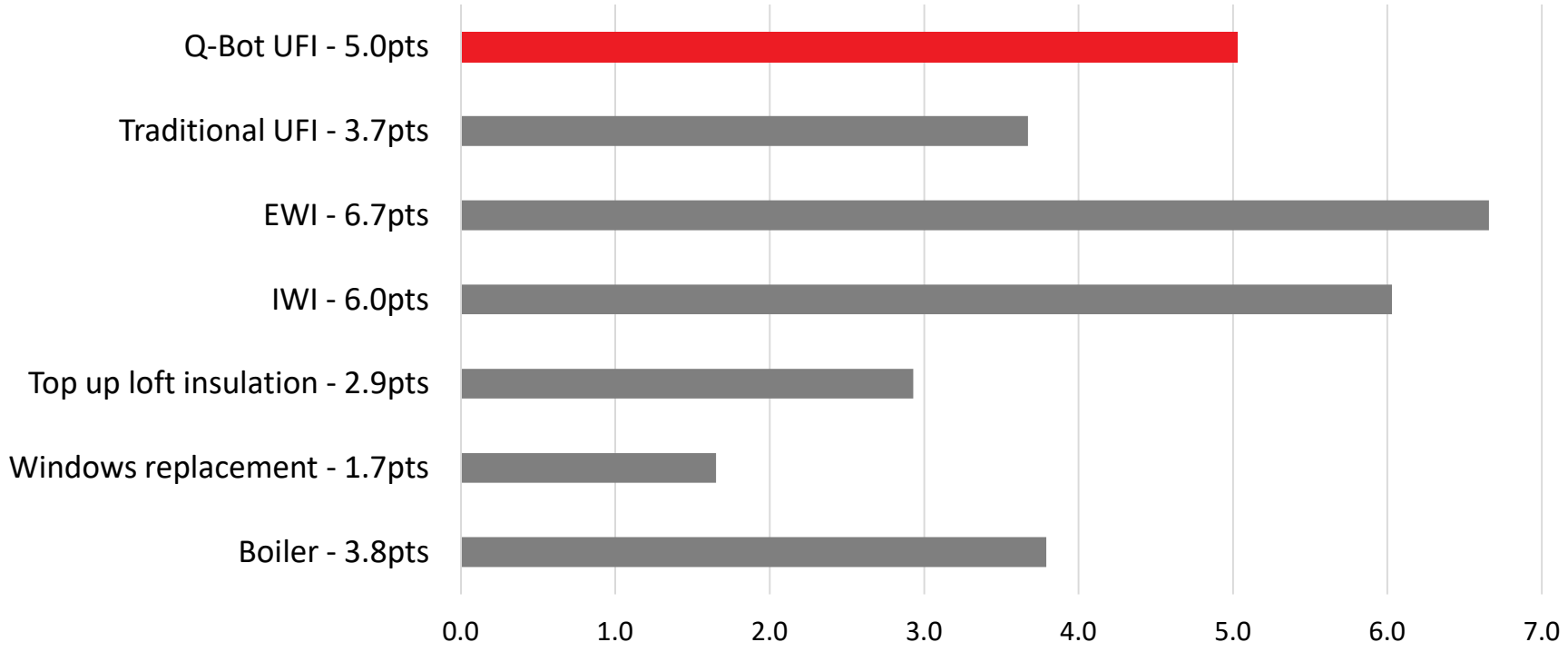
Average cost per SAP point (£ per SAP point)



Data compiled from a case study of energy efficiency measures applied across 150 homes. *Value calculated from July 2020 and is based on DEFG rated properties.

Impact

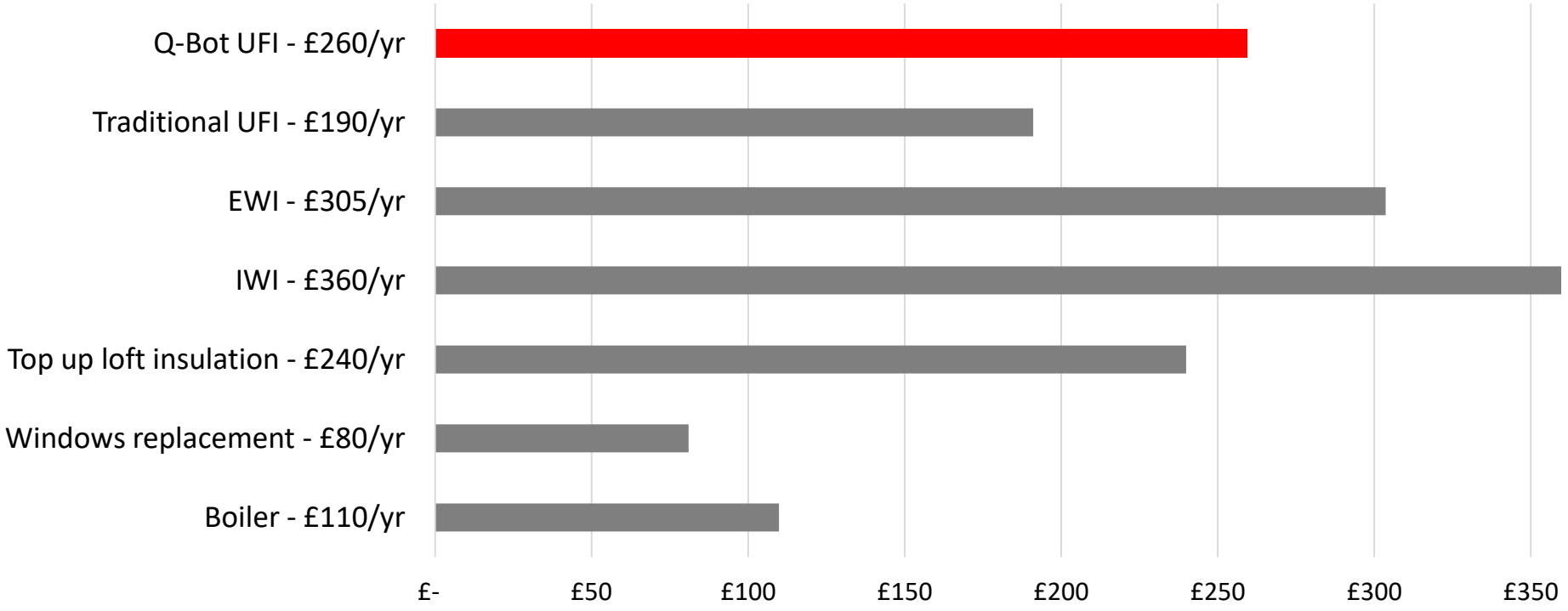
Average EPC improvement (points)



Data compiled from a case study of energy efficiency measures applied across 150 homes.

Impact

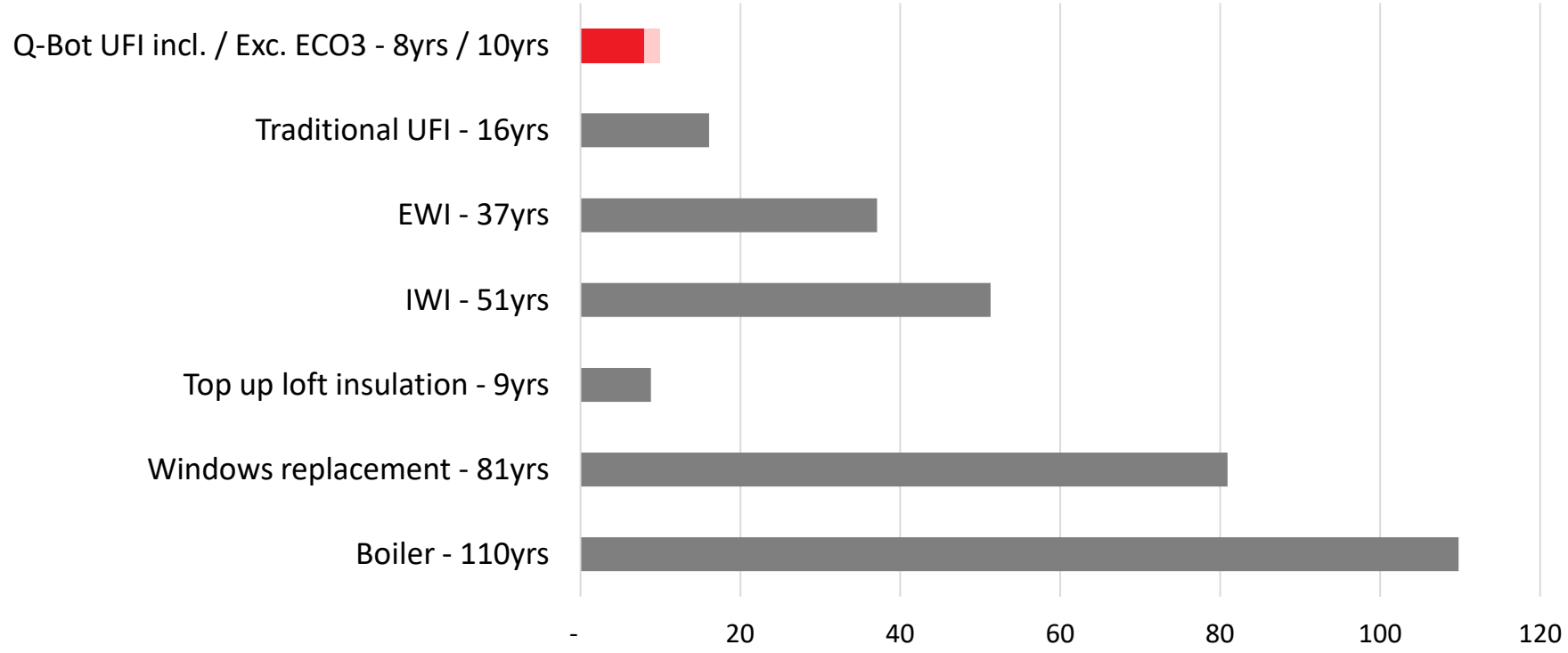
Average energy savings (£ saved per year)



Data compiled from a case study of energy efficiency measures applied across 150 homes.

Impact

Payback period (years)



Data compiled from a case study of energy efficiency measures applied across 150 homes.

Our Customers

Working in partnership with more than 40 social housing providers, including:

Any questions?

Martin Rinvolucri

E: martin.Rinvolucri@q-bot.co
T: 07467 852299

www.q-bot.co
info@q-bot.co
+44 (0) 208 877 2709