

Airoom Summary Report

Name of sponsoring supplier	Innovator / manufacturer	Name of demonstration action / product
EDF	U-Floor Technologies Ltd (Trading as Airex)	Airoom
Description of measure		
<p>Airoom is a smart passive ventilation system that has been designed as a retrofit replacement for existing air bricks that ventilate the habitable area of a home. It measures internal and external humidity as well as internal CO₂ levels and optimises ventilation to improve thermal performance of a home.</p>		
Sample size and composition		
<p>The sample sizes were:</p> <ul style="list-style-type: none"> - AirEx installation and monitoring (257 properties) - SmartHTC (206 properties) - Air tightness testing (90 properties) <p>The sample was predominantly made up of purpose built blocks of flats in Greater Manchester and Portsmouth.</p> <p>The main issues faced were with maintaining resident engagement and gaining access to complete the designed monitoring protocol.</p>		
Parameters monitored		
<p>The project team monitored a range of metrics during the trial:</p> <ul style="list-style-type: none"> • SmartHTC: a measure of the whole house heat transfer coefficient. Initial, midpoint and final meter reads were completed, alongside internal temperature monitoring across 3 different indoor locations at half hourly intervals. • Air tightness: measurements were taken prior to installation and with the Airoom vents set to open and closed • Airoom measurements: the Airoom system monitors temperature, humidity and CO₂ as well as the vent state (open or closed) <p>Unfortunately following the trial it was discovered that in some cases the air tightness measurement experimental plan failed to produce the desired data. Specifically, the Airoom systems did not change state between the tests of the system during which it was intended to be in open and close states. As such measurements were, in most cases, repeated with the vent state unchanged.</p>		

Monitoring duration

All monitoring took place between November 2021 and March 2022.

For SmartHTC monitoring, approximately 50% of the properties in the sample began the trial in open mode with the other 50% starting in active mode. Each property was monitored for a minimum of 21 days in each mode, on average for 32 days in the active mode and 37 days for the open mode.

Temperature and humidity data was gathered at a minimum of two points within each home (average 3 points) with measurements logged every 30 minutes.

Air tightness testing is completed within a home visit and is a snapshot as opposed to an ongoing measurement.

Average annual cost saving

- Average lifetime cost savings: 1.0% (+1.0/-3.0%)
 - Basis for percentage: annual space heating costs
 - Main heating source 1: gas central heating
 - Main house type: UK average (Ofgem medium typical domestic consumption value used)
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- Average annual cost savings: 1.0% (+1.0/-3.0%)
 - Basis for percentage: annual space heating costs
 - Main heating source 2: direct electric heating
 - Main house type: UK average (Ofgem medium typical domestic consumption value used)

Expected lifetime cost savings

- Average lifetime cost savings: £104 (+£217/-£217)
 - Basis for LBS: annual space heating costs
 - Main heating source: gas central heating
 - Main house type: UK average (Ofgem medium typical domestic consumption value used)
 - Expected lifetime: 25 years
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- Average lifetime cost savings: £473 (+£983/-£983)
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Summary of Discussion and Conclusion

Cost savings have been determined using SmartHTC data collected from the field:

- The average percentage HTC improvement per property served as a basis of the cost savings calculations
- The heat demand reduction for a typical UK home was then calculated based on this percentage
- The annual bills savings and lifetime bills savings were then calculated for both gas and electrically heated homes using average energy prices from SAP10

Key limitations include:

- The property sample not being fully representative of the UK housing stock i.e. limited to flats inhabited by fuel poor occupants
- Variation in weather between the two monitoring phases impacting HTC measurements
- Occupant behaviour such as window opening masking the impact of Airoom

- A lack of air tightness data which could be used to quantify the impact of the system in regulating air flow

Strict statistical analysis of the data gathered during the trial produced "Dataset 1" which shows that the Airoom system led to a reduction in the HTC (an reduction in the amount of heat a home loses) of 1% (+1%/-3%). Data from further analysis incorporating building physics principles to account for uncontrolled variables produced a "Dataset 3" of reduced size due to additional data cleansing, this suggests that the average energy saving per household was 3.9% (+2.1%/-2.9%).

Dataset 1 determines that the Airoom system can lead to a lifetime bill saving of £104 (-£217 to £217) for gas heated homes (SAP10 tariff, £0.0364/kWh), or £473 (-£983 to £983) in electrically heated households, (SAP10 tariff of £0.1649/kWh). If the Ofgem price cap energy prices were to be used, the savings reflected would be £201 (£-417 to £417) at a unit cost of £0.07/kWh for gas heated homes, or £803 (£-1670 to £1670) for electrically heated homes at unit price of £0.28/kWh.

Dataset 3 suggests that lifetime bill saving resulting from Airoom installation would be £425 (£104 to £626) in gas heated households (SAP10 tariff, 0.0364/kWh), or £1927 (£473 to £2836) in electrically heated households, (SAP10 tariff of £0.1649/kWh). When applying the Ofgem price cap tariff values, these savings would be £818 (£201 to 1204), for gas heated homes, or £3273 (£803 to £4815) for electrically heated homes.

Summary of actual costs incurred

Recruitment	Product / installation	Performance monitoring	Analysis / reporting	Technical monitoring	Supplier administration	Aftercare
£108,282.00	£186,891.00	£80,220.00	£65,856.00		£23,223.63	

