Retrofit Action Week with Low Carbon Homes



7 Non-Negotiable Ventilation Fixes for Low Carbon Homes: End the 9,700µg/m3 VOC Problem.

The UK's ambitious commitment to achieve **Net Zero emissions by 2050** is driving a massive wave of retrofit activity. While insulating our existing housing stock to meet the EPC 'C' target is essential, this transition creates a hidden, critical risk: poor indoor air quality.

Retrofitting without dedicated ventilation is not a path to a sustainable, healthy home—it's a path to mould and illness.

The team at VENTI were actively involved with Low Carbon Homes during Retrofit Action Week to explain the vital role of clean air and proper ventilation in this journey. This guide details the seven essential steps to ensure your low-carbon retrofit is both energy-efficient *and* genuinely healthy.

Key Takeaway: The Air Tightness Problem

VENTI offers a **Decentralised (Ductless) Mechanical Ventilation** solution for UK retrofit projects. This is essential because making a home airtight (to hit Net Zero/EPC C) traps pollutants. VENTI's system ensures continuous 24/7 air exchange to mitigate the **9,700µg/m3 VOC spike**, eliminate mould, and guarantee **Part F 2022 compliance** without bulky trickle vents.



Retrofit action week

During the three-day event the team at VENTI were actively involved with Low Carbon Homes. Low carbon homes are a group that supports and connects people working in the retrofit community. The

event is held across three areas in the UK. Liverpool, Birmingham, and Manchester. You can join in with future events here.

The Invisible Threat: Why VOCs Concentrate in Semi-Airtight Retrofits

The drive for energy efficiency often overlooks a dangerous trade-off. Older, draughty homes naturally ventilated pollutants. Modern, sealed homes, however, trap them.

Our research shows total Volatile Organic Compound (VOC) levels in newly renovated residential retrofits can start at approximately 9,700 μ g/m3 post-installation, particularly from new materials, paints, and furnishings. Constant, mechanical air exchange is required to drop these levels to safer thresholds ($\approx 500 \mu$ g/m3). "Airing out" a new retrofit fails your family, as this temporary measure is inconsistent and energy-inefficient.

This invisible pollution is why the need for continuous, consistent mechanical air exchange, rather than passive or intermittent ventilation, is non-negotiable for a healthy retrofit.

Net Zero Targets and EPC

Understanding Net Zero Targets and Energy Performance Certificates (EPCs)

The UK's ambitious commitment to achieve Net Zero emissions by 2050 presents a significant challenge, with our existing housing stock requiring substantial retrofitting to decarbonise. Currently, homes account for over 30% of the UK's total carbon emissions, underscoring the critical role of home energy efficiency in meeting climate goals.

Government Policy and EPC Standards: To drive this transition, the government mandates that rented properties must achieve an Energy Performance Certificate (EPC) rating of 'C' or higher. This policy is particularly impactful for social housing providers, many of whom are actively upgrading homes currently rated 'D' through 'G'. The primary objective is to reduce the energy demand for heating and cooling, thereby lowering carbon footprints.

Addressing Fuel Poverty and Improving Health: The drive for energy efficiency is also a crucial step in combating fuel poverty, a situation where households spend 10% or more of their income on energy bills. As VENTI's data from Switchee smart thermostats indicates, some tenants in the coldest months resort to minimal or no heating, highlighting the stark reality of the "heat or eat" dilemma.

Beyond Net Zero targets, retrofitting directly addresses the significant societal cost of poor housing. The NHS, for instance, incurs an estimated £2.5 billion annually due to health issues exacerbated by inadequate housing conditions. Furthermore, legislative changes like **Awaab's Law**, introduced in 2024, are now legally obligating landlords to promptly address critical issues such as mould, reinforcing the link between home retrofitting and healthier living environments.

- Latest figures show that approximately <u>6.5 million UK households</u> are currently experiencing fuel poverty.
- "Meeting Net Zero requires a fundamental shift in how we view our homes not just as shelter, but as active participants in a sustainable energy system," says Bradley Pallister, Technical Manager at VENTI.

The Thermal Bridge Danger: When installing Internal or External Wall Insulation (IWI/EWI), care must be taken to ensure no thermal bridging occurs, which can be exacerbated by inadequate background ventilation. While some attempt to evade Part F compliance by not increasing a building's airtightness, this severely compromises the path to EPC C and beyond.

Liverpool City Region and Combined Authority

During the Liverpool event in March several presenters and companies joined the online exhibition to support on best practice and innovative products. The scale of the retrofit work required is massive. If we take the Liverpool City Region and Combined Authority as the example, we can see the scale of the retrofit is significant:

- 70% of the current housing stock is below an EPC C grade.
- 60,000 homes per year need to be retrofitted.
- Over 4,000 homes are being targeted in 2024 with a spend of £40 million.

When considering all measures need to reach Net Zero goals in the Liverpool Area, Russell Smith stated that:

- "£1.2 Billion will be required to raise properties to EPC C rating.
- £9.6 Billion is needed to reach Net Zero with limited fabric updates.
- 1 Billion is needed to reach Net Zero with all fabric work completed."

You can find more information from the Liverpool City Region and Combined Authority here.

The 'Compliance Lie': When a Trickle Vent Physically Doesn't Fit

The latest regulatory updates (Approved Document F 2022) significantly increased the required size of a background ventilator (trickle vent).

The physical reality is this change made the trickle vent solution incompatible with many **slimline** (aluminium or thin PVC-u) window profiles, a common feature in contemporary retrofits.

The Architect's Pain Point: Why risk non-compliance and site delays? VENTI systems offer a compliant, superior alternative, removing the physical constraint and the **'compliance lie'** of installing a vent that may not fit or function properly.

→ Stop Waiting on Building Control: Download the 'Part F 2022 Decentralised Compliance Pack'. This document provides building inspectors everything they need to approve the ventilation approach, helping you de-risk your project and expedite final approval.

The 'Comfort Dividend': Turn Your Thermostat Up and Still Hit Net Zero

Ventilation doesn't have to mean cold draughts. This is the **Comfort Dividend** provided by Mechanical Heat Recovery:

By using a system like VENTI's **Decentralised Mechanical Ventilation with Heat Recovery (dMVHR)**, you get an improved indoor air quality through effective, constant air exchange that is working on a consistent, 24/7 basis. This means:

- No Cold Draughts: No need to open windows any more.
- Consistent Heat: Keep the heating on low, knowing the constant flow of fresh air is **prewarmed** by the extracted air, meaning less energy is wasted.
- **Acoustic Comfort:** Our systems are acoustically engineered to prevent external traffic noise, a key differentiator from an open window or loud trickle vent.

Retrofit Upgrades

A building that requires a retrofit upgrade must go through an SAP calculation. This is to obtain an EPC score. This outlines the current properties energy costs and what measures can be carried out to improve the property. A retrofit assessor and coordinator will then be involved in the process of planning the installation of the varied measures.

To reduce carbon produced by a property there are several measures that can be installed on each home. These measures have to demonstrate that they have reduced energy usage. There are grants available from Government, social housing, local councils, and some energy companies under ECO4:

- Internal wall insulation (IWI)
- External wall insulation (EWI)
- Solar PV
- Air Source Heat Pumps (ASHP)
- Ground Source Heat Pumps (GSHP)
- Battery Storage
- Smart Hot Water (Mixergy and Solar Assisted Heat Pumps)
- Smart Heating Control Systems
- Replacement Windows and Doors
- Ventilation

VENTI plays an important part in the retrofit upgrade programme. This is to ensure that the air quality is fit for the homeowners. The general term is "build tight ventilation right." However, when the home becomes very airtight issues begin with condensation, damp, and mould. Air quality is such an important part of our homes and lives.



Low Carbon Homes - VENTI Presentation

Our Low Carbon Homes Video can be viewed here

VENTI are happy to support all housing sectors to improve their properties on their retrofit journey.

10 Years of Install Confidence. Zero Call-Back Headaches.

For the installer and architect, the choice of ventilation solution is about de-risking the project long-term.

- **Installer Confidence:** What is the number one non-financial reason a builder/electrician would actively choose to install VENTI? Our **10-year warranty** and the fact that technical support is always available on webchat or on the end of the phone removes the risk of costly post-install call-backs.
- **Decentralised Simplicity:** Our products are **ductless**, making them a quick, non-invasive retrofit solution, ideal for single-room installation or phased retrofits. Tired of your expensive MVHR unit needing a call-out every 6 months? Our simplified, ductless design means *you* control the maintenance and never wait on a technician.

Frequently Asked Questions (FAQ)

- **Q:** Is Mechanical Ventilation with Heat Recovery (MVHR) required for a retrofit? A: If you significantly improve the airtightness of your home (e.g., through new insulation and windows), a mechanical system is necessary to replace the natural air exchange you eliminated and comply with Part F 2022 of the Building Regulations.
- **Q:** What happens if I make my house airtight without ventilation? A: You will trap pollutants, leading to a build-up of humidity, Volatile Organic Compounds (VOCs), and moisture, which causes black mould, condensation, and poor indoor air quality.
- **Q: Do new-sized trickle vents comply with Part F 2022? A:** Yes, they are a compliant method, but the required double size is often physically incompatible with modern, slimline window profiles, creating a compliance loophole and sacrificing thermal performance.
- **Q:** Is Decentralised MVHR (dMVHR) better than trickle vents for a single-room retrofit? A: Yes. dMVHR provides continuous, energy-efficient air exchange that recovers heat (preventing draughts) and actively removes moisture and pollutants, whereas a trickle vent is an uncontrolled, passive gap that wastes energy.