Visual and Data Tools

Using visual tools and real data, householders can better understand how their home is performing and be motivated towards retrofit

How it works

Visual tools and real-life data give tangible information to householders about problem areas to tackle through retrofit.

Thermal imaging provides coloured images based on heat loss from surfaces. Used inside, they give a clear indication of where a home is losing heat, and can help to flag cold spots such as uninsulated loft hatches or cold bridging. Outside, thermal images are less useful to clearly pinpoint heat loss as there is a lot of environmental interference. The colour spectrum shows heat loss intensity, and can indicate priority areas to tackle. **Smoke pencils** are a simple tool for making draughts visible. They often pick up issues such as small gaps between timbers or around windows that may have gone unnoticed.

More advanced tools for measuring **air tightness** include **blower doors** and **mobile fans**, which can be used in conjunction with thermal imaging and smoke pencils to pinpoint areas of heat loss. Blower doors can provide a measured air tightness test. More advanced **heat loss testing** involves use of **sensors** to measure heat loss, usually over a three-week period of normal building use, taking into account indoor and outdoor temperature to determine the building's real energy performance – rather than its theoretical performance measured by Standard Assessment Procedure (SAP) used for Energy Performance Certificates (EPCs). Sensors can also measure **humidity** and **air quality,** which can also help inform and motivate decisions.

Case studies

Futureproof Wiltshire LEAD used various visual and data-based tools to enhance retrofit advice and motivate action. **Testlands Wellbeing LEAD** used thermal imaging cameras during home visits, to show people where radiators were blocked or needed bleeding.

Image © West of England Combined Authority

What you'll need

Depending on your chosen approach, you may need:

- Kit – simpler options can include a thermal imaging camera or smoke pencil, while more skilled work may use blower door or other air leakage testing equipment
- Heat loss or other sensors
- Staff or volunteers who are trained in using kit effectively and can carry out home assessments
- A plan for integrating equipment into your advice delivery – for example, some equipment can only be effectively used in winter, at night and in certain weather conditions – including how you will follow up with next steps

Why it works

Meter readings and bills can give us objective information about how much energy we're using, but this information is hard to relate to specific heat loss, and can feel intangible. EPCs can tell us theoretically how our homes should be performing, but don't always reflect how energy is really moving in the home. Visual and data-based tools can bring our experiences to life: making heat loss tangible, confirming our physical experiences of cold and draughts by pinpointing the sources of this discomfort, and providing strong motivation to undertake retrofit by clearly showing problem areas and priorities. Research on use of thermal imaging in advice has showed that it helps householders recall advice and, if it's a thermal image for their own home, they are more engaged in the report, and more likely to share the image with others, adopt more energy-efficient behaviour and have stronger energy saving intentions (Boomsma et al, 2016). People are even more likely to make changes if their own thermal images are compared to more energy efficient homes (Papineau and Rivers, 2021). Sensors and data logging to determine accurate heat loss can also help give a more accurate idea of the likely benefits of retrofit measures.

Top tips

- ✓ Visual tools are a great way to overcome scepticism and provide quick-wins, such as bleeding radiators and simple draughtproofing, as well as leading to more advanced retrofit.
- ✓ Some tools, such as thermal imaging cameras and smoke pencils, are easy to use, and can be hired out to community groups or households.
- ✓ Many of these tools need to be used in winter, with the heating on, to give useful information.
- ✓ Training is recommended for thermal imaging cameras – best use depends on the season, time, weather and temperature difference between the inside and outside of the home.
- ✓ Some methods are more technical, requiring special kit or expertise; there are private sector specialists who can provide these services if you can't offer this in-house.

Resources

- The CAG Guide to Running a Thermal Imaging Project by Community Action Groups (CAG) and Low Carbon Hub
- Other relevant LEAD Toolkit contents (see South West Net Zero Hub): **Futureproof Wiltshire LEAD** (project summary), **EnergyWise LEAD** (project summary)
- SWNZH LEAD Webinar Series: Innovations in domestic retrofit advice - Retrofit as a service 22 Jan 2025 (24:26 to 27:51) (see also full slides).

About LEAD

LEAD is managed by South West Net Zero Hub and funded by the Department for Energy Security and Net Zero. The programme is trialling innovative approaches to retrofit advice for hard-to-reach groups and hard-to-treat homes. Find out more here.

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