Why are natural materials so important for retrofit?

Conventional systems use vapour closed insulation such as foamboard with a vapour barrier to stop moisture getting into the existing structure. Wind driven rain and internal moisture passing through weak points in the vapour barrier can become trapped behind the impermeable insulation and build up over time.

Natural insulation like woodfibre and hempcrete can absorb water vapour when it’s humid and release it safely when it’s drier when used with breathable natural paints and finishes. Moisture is not trapped, but evaporates away.

Examples: woodfibre, hemp, sheep’s wool, cellulose, cork, timber, lime, straw, earth, clay, natural paints, and more.

What are Natural Building Materials?

We define ‘natural materials’ as:

- Materials that are abundant or renewable, with minimal processing and therefore low-embodied energy.
- Materials that are healthy, non-toxic and part of a continuous life-cycle; easily reused, recycled or returned to the earth.
- Materials that are sourced responsibly, with minimal ecological damage and preferably part of a regenerative land stewardship.

Examples: woodfibre, hemp, sheep’s wool, cellulose, lime, straw, earth, clay, natural paints, and more..
**Ventilation**

Ventilation is key for good indoor air quality and a healthy environment. You can make a start by unblocking trickle vents or installing humidity controlled air inlets under suspended floors are clear from obstruction to allow humidity controlled air inlets. And make sure any airbricks with trickle vents are not enough to properly ventilate even a moderately airtight building to create a healthy internal environment.

You can make a start by unblocking trickle vents or installing humidity controlled air inlets. And make sure any airbricks under suspended floors are clear from obstruction to allow ventilation to dry the space.

**Improve Airtightness**

Improving airtightness is one of the best ways to save energy in your home!

Seal up any chimneys, around leaky windows/doors and gaps around services such as pipes as a first step.

Aim for a continuous airtight layer with no interruptions, ideally on the inside of the insulation. Make sure to use a vapour open or variable (sometimes called smart) airtight membrane, its even more important to use a vapour open airtight layer if its on the external side of the insulation.

**Insulation**

Aim for a continuous layer of insulation with no interruptions (thermal bridges) using natural insulation and breathable finishes to avoid trapping moisture and causing damage to the existing structure.

Use flexible/loose fill insulation between timber joists, roof rafters, and wall studs, which easily fully fills the spaces between timbers without air gaps.

Use semi-rigid boards, such as woodfibre or cork either side of timber and masonry structure. Insulation can also be cast such as Hempcrete or insulating lime render/plaster, particularly on masonry and between timber framing.

**Lofts**

1. Lay 300mm insulation between and over ceiling joists in alternating layers, with an airtight breather membrane and loft boards over for storage. Make sure roof and wall insulation connect - but don’t restrict ventilation to the loft.

2. When insulating between and below rafters from inside, always ensure a 50mm air space is maintained between the top of the insulation and roofing felt/sarking boards for ventilation to the loft. This can be done by fixing 50mm battens either side of rafters to create the ventilation space.

**Walls**

External Wall Insulation (EWI) is less disruptive than internal but can affect the appearance of a building and you may require planning permission. Make sure eaves and window cills etc. are deep enough, or can be adjusted, to suit the increased wall depth.

3. Internal Wall Insulation (IWI) doesn’t need planning and is better for thermal comfort as wall surfaces will be warmer. Take care not to add too much IWI as it makes the existing wall colder and can cause moisture problems.

**Floors**

(3) Internal Wall Insulation (IWI) doesn’t need planning and is better for thermal comfort as wall surfaces will be warmer. Take care not to add too much IWI as it makes the existing wall colder and can cause moisture problems.

4. Install rigid insulation over existing solid floors - even 10mm of cork will make the floor feel warmer. If you have the budget, you can dig up existing solid floors to install a fully insulated floor. A limecrete slab over compacted foamglas aggregate is a breathable solid floor option.

5. Replace old windows and doors with triple glazed or high performance double glazed timber framed units. Triple glazing feels warmer so is more comfortable, and is better at keeping noise out.

Avoid overheating in summer by not adding large windows. Consider adding external solar shading, it is more effective at preventing overheating than internal blinds.

**Cavity Walls**

We only recommend retrofitting Cavity Wall Insulation (CWI) if you are also adding EWI, never combine CWI with IWI. Retrofitting CWI on its own can lead to moisture problems, follow guidance from the NIA. Use a polystyrene bead system or consider cork granules / mineralised woodchip as a more sustainable material to use above DPC level.

**Heating & Renewables**

Invest in an appropriate low carbon heating system such as an Air Source Heat Pump (ASHP) with underfloor heating. There are other options and ASHPs can also work with radiators if they’re sized correctly.

Consider renewable technologies such as PV solar panels, but this is normally only worth investing in after all other improvements to the building have been done!