

Fabric first principles

By adopting fabric-first principles we prioritise energy saving measures first in order to make our homes more comfortable and affordable to heat. This is before we start to consider changing heating and hot water systems.

Although it can be disruptive and costly to carry out fabric improvements, it is more carbon cost effective as you save more over the life-cycle of these measures than you do with system upgrades.

Prioritising fabric improvements will reduce upfront (capital) heating system costs. Improving the insulation performance of homes results in the need for smaller sized boilers and radiators, which means lower energy running costs.

A whole house approach

This approach considers a broad range of aspects: your comfort, your home and its history, indoor air quality and ventilation, moisture inside your home, energy use and bills reduction, as well as CO2 emissions. This holistic view helps to identify your options and how they can work together. It also reduces the risk of unintended consequences.

For example, if the house becomes well insulated and more airtight but the ventilation strategy is not upgraded to provide the right level of ventilation, the risk of mould related issues increases.



Wayshaper
Sustainable homes



Carbon emissions

Reducing the energy demand of your home through fabric improvements has the benefit of reducing carbon emissions. It can also save you money on energy bills. In many cases, reducing emissions beyond fabric improvements means tackling your space heating source. This requires a switch from domestic fossil fuel boilers and transitioning to electric heating and hot water.

Due to the UK's distorted energy prices (gas is significantly cheaper than electricity), this could have a negative financial impact on your budget and bills, especially if energy demand is not significantly reduced before switching. Focusing on energy use and switching to electricity future proofs your home as we head towards net zero and a renewable and low carbon future.

Contact

Resources
wayshaper.co.uk

Inquiries and website support
hello@wayshaper.co.uk

Community
facebook.com/wayshaper

Expert retrofit support
Contact James Neward for further information about CCH's paid service at james@cch.coop

CCH Wayshaper is owned by the Confederation of Co-operative Housing (www.cch.coop)

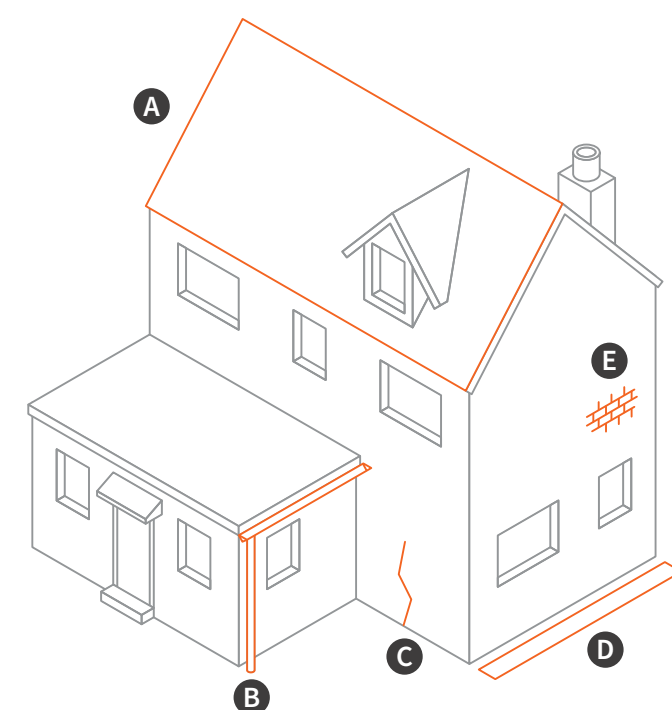
Fabric interventions

1 Remedial work

Before any improvement works are carried out, it is essential to make sure that any problems have been fixed and that the house is in a state of good repair. This extends the lifespan of any works to improve your house for as long as possible.

Example measures include:

- A Roof repair or replacement
- B Gutter and/or downpipe repair
- C Structural crack repair
- D Install a French drain or carry out remedial damp proofing
- E Repointing or render repair



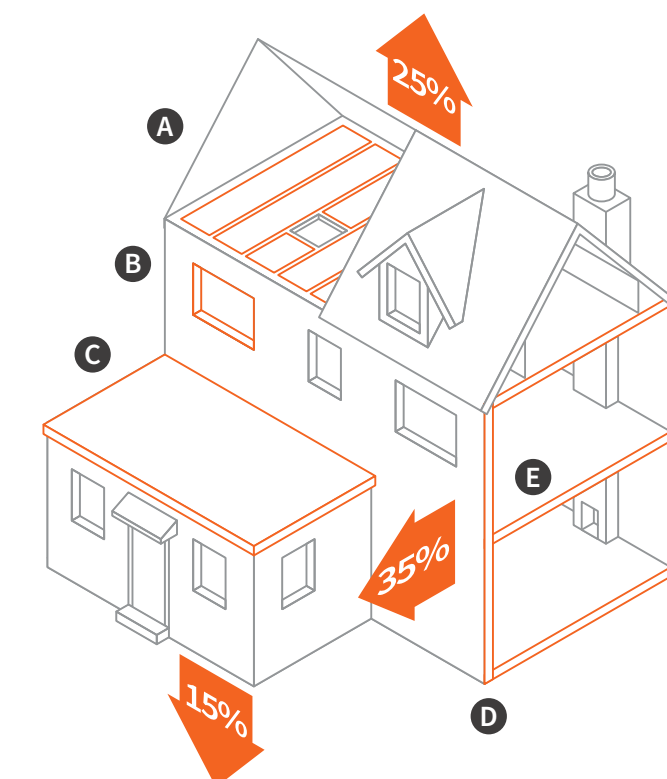
2 Insulation

Once any existing issues are fixed, the building fabric (roofs, walls, floors) should be improved so the heat losses are reduced. This can be done by adding insulation, which has a long life compared to other measures such as boilers, ventilation and renewable energy systems.

The heat loss percentages from the roof, walls and floor of a typical home are shown. These can be reduced by improving insulation.

Example measures include:

- A Loft or pitched roof insulation
- B Replace window frames and/or glazing
- C Flat roof insulation
- D External or internal wall insulation
- E Floor insulation (solid or suspended)



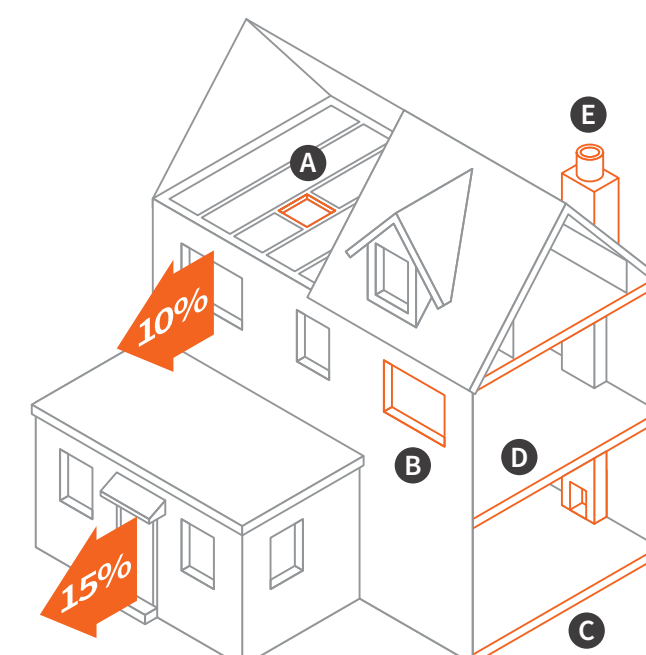
3 Airtightness

Airtightness is essential for a comfortable, draught free, and energy efficient house. Improving it means removing all the gaps, cracks, and unwanted openings in the external envelope of your home which comprises the roofs, walls, windows, doors and floors, in order to minimise leaks and draughts.

The heat loss percentages from the windows and doors of a typical home shown. These can be reduced by improving airtightness.

Example measures include:

- A Draught strip loft hatch
- B Refurbish and seal door/window frames
- C Seal suspended ground floors
- D Draught strip roof and intermediate floors
- E Seal and cap off chimney



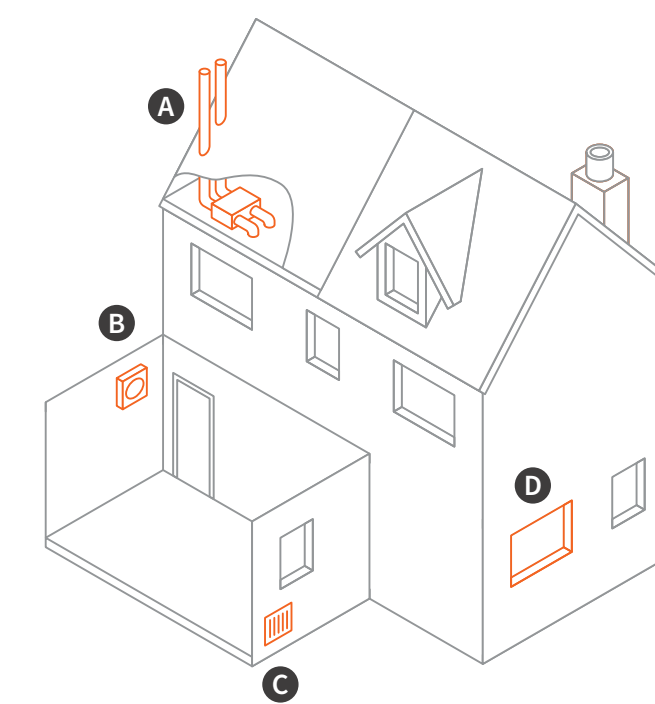
Building services improvements

4 Ventilation

Insulating and increasing airtightness in houses makes ventilation a key consideration for the retrofit works. Good air quality is essential to a healthy, comfortable home; reducing stuffiness and maintaining the health of residents. It is also essential to deal with excessive humidity, which if not controlled, can lead to condensation, damp, mould and health problems such as respiratory illnesses. Appropriately controlled ventilation is required to help maintain good relative humidity levels

Example measures include:

- A Whole house supply and extract system
- B Extract purge ventilation
- C Increase background ventilation through wall vents
- D Increase background ventilation via trickle vents on windows and purge ventilation via windows which can open

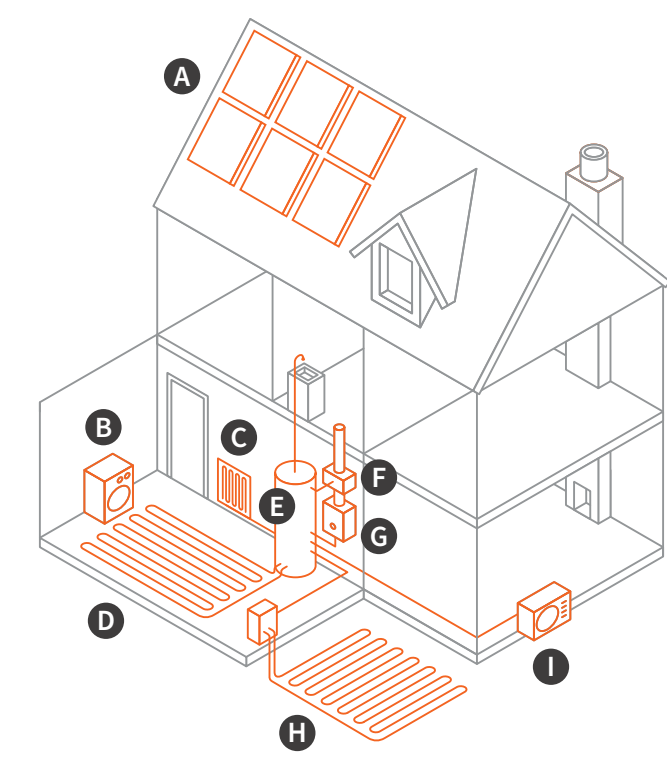


5 Building services and renewable energy

Once the house is better insulated and less fuel is used for heating, the building services (heating, water, electricity) should be made more efficient. Building services have relatively short lives compared to insulation and they need to be replaced more regularly. Once the heating demand is lower and the building services are more efficient, the potential for renewable technology should be considered.

Example measures include:

- A Solar panels (photovoltaic or solar thermal)
- B Energy efficient appliances
- C Radiators
- D Underfloor heating
- E Hot water cylinder
- F Heat recovery technology
- G Replacement boiler
- H Ground source heat pump
- I Air source heat pump



1 Workshop preparation

Planning and preparation will help to create efficient and effective workshops and should be carried out at least 10 days ahead of a workshop to minimise potential delays

Check your cards

The toolkit contains a card which lists the quantities of cards. Check that your toolkit is complete before commencing a workshop. If any sections are incomplete please email a replacement request to hello@wayshaper.co.uk at least 10 days in advance of the workshop.

Online resources

The options workshop cards link to web pages containing more information. These are accessed via the web addresses or the QR codes shown on each card. Access to these is granted under your account. Check that you have access to these resources pages via one the web addresses or QR codes on one the cards, then logging in. Otherwise simply log in to your Wayshaper account.

Virtual workshops

Any participants joining a workshop via video call should have their own toolkit cards which can be ordered from hello@wayshaper.co.uk at least 10 days in advance of a workshop.

Building standards

Understand whether the homes need to adhere to particular standards as this may impact on choice of retrofit options, e.g.

- Improved energy performance certificate (EPC) rating
- Nearly zero-emission building (NZEB)
- Passive House EnerPHit
- Association for Environment Conscious Building (AECB) Retrofit Standard
- London Energy Transformation Initiative (LETI)
- Energiesprong

Property information

Gather the following information before conducting a workshop:

- EPC certificate or link to an online certificate for each home
- Listed building or conservation area status, if applicable
- Record of known issues with building fabric, heating, or hot water system
- Details of any planned maintenance cycles which retrofit works can be timed to coincide with to reduce disruption and cost

During later stages of the retrofit process you'll need to gather further information. This is not essential for the Wayshaper workshops, but there should be consideration for gathering the following documents to assist with more detailed planning:

- Building conditions survey
- Details of any existing retrofit measures
- Floor plans and other drawings
- Survey details showing building structure, e.g. materials used in walls, roofing etc

Objectivity and equity

It's helpful to agree an objective metric by which different homes can be compared, so that retrofit works can be prioritised for those most in need, and where the greatest positive impact can be made. The energy performance certificate (EPC) for each home is one way of comparing high level and basic relative energy efficiency and related fuel consumption.

However, it's important to take into account the individual circumstances of residents whose experience may differ from that of other residents. For example residents with lower mobility, or who experience greater sensitivity or particular impacts on their health as a result of conditions such as overheating or being cold.

Workshop facilitator's checklist

The workshop facilitator may find it helpful to run through this checklist:

- The toolkit has been checked as complete and any missing cards have been requested at least 10 days before the workshop
- A method for objective yet equitable decision-making is in place
- The residents have an agreed shared vision and values
- Any workshop participants attending via video call have their own sets of cards
- The account log in has been tested and the online resources are accessible

2 Conversations workshop

The aim of this stage is to explore what's important to residents in terms of their domestic energy consumption, the related carbon emissions, and their well-being and comfort in their homes

Instructions

- 1 Have the property information detailed in the workshop preparation notes to hand.
- 2 State the vision and values shared between the residents, the process which is to be used for holding the conversation in a fair way so that all voices are heard, and the process for decision-making.
- 3 Discuss the conversation topics in any order. Record the needs and preferences of residents, some of which may be common amongst residents, whereas others may be specific to a particular resident or their home. These findings will be used to help prioritise the retrofit works to be considered in the options workshop. The workshop may need to be carried out over more than one sitting.

The numbers of residents reporting problems or preferences can be written on the workshop cards, to create a quantitative assessment of needs.

Questionnaire for larger groups of residents

Larger groups of residents may make a face-to-face workshop impractical. A questionnaire can be used instead to gather responses to the conversation topics.

Visit wayshaper.co.uk/conversations to obtain:

- The series of questions to be used in your chosen survey software along with notes on software options
- A questionnaire PDF which can be filled in on a computer or printed out

These are the same questions shown on the conversations workshop cards:

Energy

Do any residents experience any of the following problems?

- Cost of energy
- Concern about carbon emissions due to energy use

Do any residents have any of the following preferences?

- Transition from gas to electric energy
- Use renewable energy from the grid
- Generate own renewable energy

Temperature

Do any residents experience any of the following problems?

- Cold due to cost of energy
- Cold due to inadequate heating
- Cold due to draughts from windows
- Cold due to draughts from doors
- Cold due to draughts from flooring
- Faulty radiator valves
- Overheating during Summer
- Overheating during Winter

Moisture and indoor air quality

Do any residents experience any of the following problems?

- Damp
- Condensation
- Mould
- Leaking roof
- Leaking windows
- Indoor air quality

Noise pollution

Do any residents experience any of the following problems?

- Noise from road or air traffic
- Noise from neighbours above/below
- Noise from neighbours to the side

Buildings

Do any residents have any of the following plans or preferences?

- Considering works which could be carried out simultaneously with energy efficiency measures, e.g., extension, loft conversion, or internal alterations?
- Wish to avoid losing particular features of their homes as a result of a retrofit, e.g., open fireplace, window style, or cornicing detail?

Outcomes

Whether gathered during a face-to-face workshop or via the questionnaire, there should now be a quantitative overview of any problems experienced by residents in relation to the areas covered by a retrofit.

However, as mentioned under 'objectivity and equity' there needs to be a qualitative assessment to take into account the different needs of residents. This toolkit is designed to help you navigate the retrofit options available in an objective way, but the final decisions will always be made subject to the residents' own methods of achieving equity.

3 Options workshop

This workshop can be carried out with all residents involved when there is a smaller group, or else just a working group who are responsible for planning and execution of the retrofit, representing the needs and preferences gathered in the conversations workshop or questionnaire

Instructions

- 1 Have the property information detailed in the workshop preparation notes to hand.
- 2 The sets of options cards are numbered and should be tackled in that order. This holistic approach follows a fabric first process, by firstly tackling energy losses through insulation and airtightness improvements along with any necessary remedial works, before progressing to ventilation, building services, and renewable energy systems. There are multiple options within each section to take account of the differing characteristics and constraints of the residents' homes, as well as their differing needs and preferences expressed in the conversations workshop.

The cards note whether retrofit options impact on each other, whether any should be carried out in a particular order, and which can be carried out simultaneously to reduce cost and disruption.

- 3 Refer to the linked online resources to help deepen understanding of the options of most value and impact. The final selection of options can now be fed into a broad action plan and explored further with specialist support.

How to read the cards

The options cards provide concise overviews of each of the potential retrofit measures you may consider. They're not intended to be exhaustive in their descriptions, but to broadly outline the main benefits and considerations, with more detailed information available on the linked web pages.

Traffic light system

The options cards highlight some key considerations:

- **Something which will obstruct this option**
- **Something to be aware of or which may present difficulty**
- **Options which are available**
- ⓔ **Grant potentially available, check the linked web page**

Linked web pages

Each card links to its own web page containing more information and helpful links. The web page addresses are shown at the bottom of each card, along with a QR code which links to the same page.

Carbon cost-effectiveness

- The measure pays for itself
- £0–10/tCO2
- £10–100/tCO2
- £100–500/tCO2
- >£500/tCO2

This is a way of measuring the relationship between the fuel cost savings and the emissions reduction in tonnes of CO2 (tCO2), calculated based on the lifespan of each individual measure, using the following formula:

$$\text{Carbon cost effectiveness (£/tCO}_2\text{)} = \frac{\text{Net £ cost (capital cost minus fuel savings)}}{\text{Whole life carbon emissions reduction tCO}_2}$$

Relative cost

- up to £100
- £100–£1,000
- £1,000–£5,000
- £5,000–£10,000
- £10,000–£20,000+

These are broad indicators and should be used as a comparative metric rather than for planning budgets.

Disruption

- Minimal
- Low
- Moderate
- High
- Significant

Many works can be carried out in separate stages whilst the home is being lived in, reducing disruption. However, combining works can reduce overall cost.