

How to develop User Guidance for a Passivhaus building

Technical briefing document

December 2013

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How to develop User Guidance for a Passivhaus building

Passivhaus Trust Technical Briefing Document

1. The Context

This document provides guidance for the industry on how to produce effective User Guidance for Passivhaus buildings. This addresses information required for non-expert users of the building. While this guidance is focussed specifically on Passivhaus buildings, it also provides a useful resource for other low-energy buildings.

The Passivhaus Trust has some shared resources that can be used in the development of User Guidance for a Passivhaus building:

- Generic written content for each section, to be adapted for specific buildings eg. What is a Passivhaus, myth-busting, list of do's and don'ts?
- Photos, diagrams and other visual material for use in explaining principles and how the building works.
- Content from PHT's earlier published guides- 'Passivhaus: an introduction' and 'Why choose Passivhaus'.

The Passivhaus Trust is also planning to develop some further resources that can be used in preparing User Guidance for a Passivhaus building:

- Template written guides for simple buildings, which can be adapted and edited as necessary.
- Template posters for MVHR, heating systems and controls etc, to allow system specific information and images to be inserted.
- Examples of best practice guides in different formats – written guides, laminated posters, technical manuals, videos, online support etc.

These resources will be available on the Trust's website in 2014.

2. Why, how and who for?

A. The need for guidance

1. Different levels of understanding and information are needed by each audience – occupants, building managers, support and maintenance teams etc.
2. New occupants of any house/building should be provided with information about the property on at least three levels- Emergency, Maintaining comfort and How to get the most out of your property.
3. The varying reliance of building performance on occupant operation.
4. Lack of engagement of occupants with user guides – often lost or ignored.
5. The need for multiple handovers – people often don't take things in on moving day so need further follow-ups, and possibly a helpline or online questions facility.
6. Timing – guides are often produced at the last minute, not allowing sufficient preparation.

Need for information on Passivhaus to be combined with other requirements such as fire regs and Code for Sustainable Homes.

B. Occupant induction process

User Guidance is a component of an extended occupant induction process. Therefore how the guidance is presented to the intended audience will be crucial to how effective it is, and a staged process may be required, possibly to include:

1. Advance information or video, to prepare occupants for their new home
2. Moving in day – basic information provided, but unlikely to be taken in properly
3. Demonstration and reminder of information approx. 2 weeks later
4. Next season – reminder of how to use systems (heating or cooling)
5. Review of process etc for next people to move in

The Occupant Induction process is likely to include several of a number of components:

1. Group presentation of key features of the future property
2. One-to-one demonstration in the property of these features, encouraging hands-on, and requesting confirmation of understanding
3. Quick reference material
4. More detailed reference guide

This document focuses on the quick reference material and the guide.

Note that learning from the Occupant Induction process should be used to inform future builds. Design should be mindful of how occupants will get the best from the building, and how they will acquire the knowledge to achieve this.

C. The audiences for User Guidance

The guidance, be it in a written, graphical or video format should be presented in a manner that is accessible, engaging and useful for the specific audiences as identified below. Note that while there may be common

elements across the information for the different audiences it is unlikely that a single guide could be written to suit all audiences.

1. Occupants (domestic and non-domestic) - Information as far as possible should be presented aural/ visually/ graphically. If using a written guide, then the text should be kept brief and simple. Laminated posters may be mounted next to controls or inside cupboard doors, describing how to operate and maintain key systems in the building, such as heating and ventilation.
2. Building managers- A written guide where responsibilities are clearly identified. This should be prepared in conjunction with the Building Log Book – see CIBSE TM31.
3. Support Team – Key points to be aware of should occupants phone for assistance- who to send for if maintenance is required.
4. Maintenance Teams- Specific manuals for visiting maintenance teams, such as plumbers (who may not have encountered a Passivhaus building before) – outlining what is different about this building etc.

3. User Guidance formats

The design and format of the guidance will be very important. Different medium can be used to meet the needs of different audiences. Listed below are examples of best practice across various media:

A. Written User Guidance/ Manual

The Scottish Sustainable Buildings' guide *How Your Low Carbon Home Works*- see figure 1.

Produced by Glasgow School of Art, this guide is not specifically for Passivhaus buildings, but provides a good example of design, with clear layouts, minimal text, simple diagrams and drawings linked to plans and photos of the house with colour coding.

B. Laminated posters

Bere Architects' *User Guide poster for Ranulf Road* (Camden Passivhaus)- see figure 2.

Again, photos of the systems linked to plans and section of the house, help the occupant to understand how they are intended to work.

C. Videos

Series of clear and succinct guidance videos for residents developed by Radian Housing Group and published on their YouTube channel- see figure 3.

1. [How does my home work? Mechanical Ventilation and Heat Recovery](#)
2. [How does my home get maintained? When does Radian check the MVHR filters?](#)
3. [What if something goes wrong? How to report a repair?](#)

D. Door hangers and stickers

Door Hangers and stickers for residents developed by Gentoo Group for the Passivhaus Racecourse Estate- see figure 4 and 5.

These clear and graphical door hangers and stickers located next to the systems and outside rooms help to remind the occupant on how the system works and how best to use them.

How your home works:

Your house

Welcome to your new home. This quick start guide is designed to help you get the best out of your new house, keeping your bills and carbon footprint as small as possible.

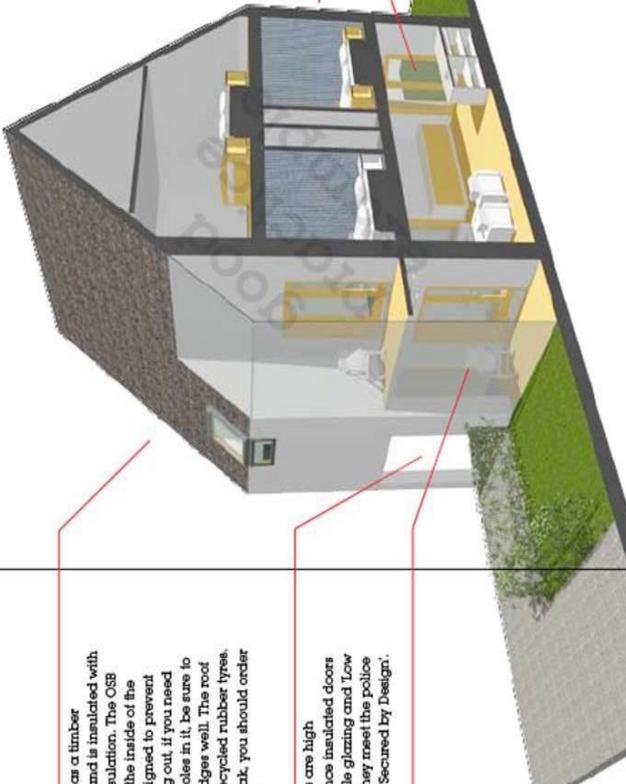
Your house is designed to keep the heat in. It is constructed from timber frame with a timber roof structure and is very well insulated. It has double glazed windows and well insulated doors.

Your house has an efficient gas fired heating system, mechanical ventilation with heat recovery system and your hot water is heated by your gas boiler and solar panels. It also has sun spaces in front of the living room which can bring warm air into the house when it is sunny.

Roof
The roof has a timber structure and is insulated with 350mm insulation. The OSB board on the inside of the roof is designed to prevent air leaking out, if you need to make holes in it, be sure to seal the edges well. The roof tiles are recycled rubber tyres. If tiles break, you should order new ones.

Doors
Your doors are high performance insulated doors with double glazing and 'Low E' glass. They meet the police standard 'Secured by Design'.

Sunspace
On the front of the house is a sunspace, it is outside the insulated part of the house and is designed not to be heated. When it is sunny it will warm up and you can open the doors to let heat into the house. See page 13 for more information.



Walls
Your house is built from a timber frame which is fully filled with 140mm insulation, the bricks are fixed to this frame. Your home has been carefully detailed to avoid draughts, you should avoid drilling holes deep into the wall to avoid creating a new route for draughts.

Windows
Your windows are high performance double glazing with Low E glass. They meet the police standard 'Secured by Design'. All of your windows open and can be cleaned from the inside. There are escape windows in bedrooms on the first floor.

OVERVIEW

Figure 1 'How Your Low Carbon Home Works' by Scottish Building Standards for occupants

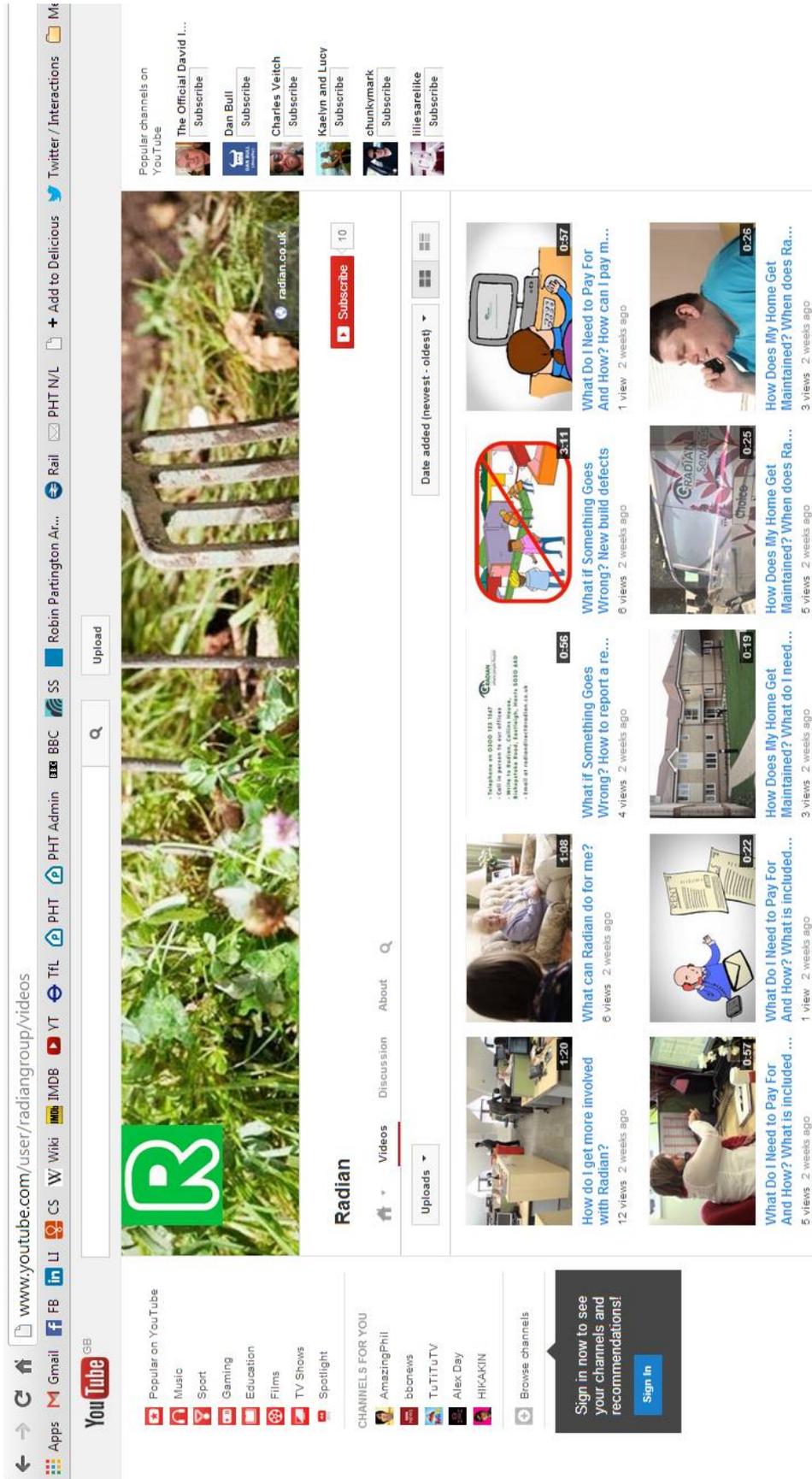


Figure 3 Radian Group’s YouTube channel featuring occupant guidance videos



Figure 4 Door Hangers at Gentoo's Passivhaus Racecourse Estate



Figure 5 Wall stickers at Gentoo's Passivhaus Racecourse Estate

4. Contents and design

A. Design

Whichever format is used, the design of the guides will be very important, and the information should be presented to be as engaging as possible. By using visual material, and clear succinct text, information can be presented in a way that is accessible and appropriate for the intended audience. Visual material also helps transcend language barriers and makes it easier to have versions of the guidance to suit non-English speaking audiences. Gender and techno-phobia/philia must also be taken into consideration.

B. Contents of a written User Guide

Written content should be presented from the view of the building occupant or user. e.g. “your energy bills will be very low because ...”; “the air in your home is kept fresh by ...”; “your home is kept warm by ...”

Contents should include the following:

1. Introduction – brief description of what is different about this building and how to live in / use / manage this home / building (e.g. smoking, variations in occupancy, window opening etc.)
2. How to look after your home / this building – description of how this building is designed to work, key systems, what maintenance is required, how often, who is responsible (if not you) and how to contact them.
3. What to do if ...? – FAQ type section describing what to check and what to do if it's a bit cool, or too warm, or stuffy etc.
4. How to fix things – details of what to do and/or who to contact if things aren't working (e.g. changing the MVHR filters, contacts for the housing maintenance team etc)

Potential table of contents for a sample written user guide:

Welcome	Good Practice guide	Maintaining comfort What to do (and not do)	How to get the most out of your property? Getting used to living in a Passivhaus	Trouble-shooting
1. Benefits 2. Myth busting	1. Not just needed for Passivhaus building 2. Should mention other systems e.g. PV, solar thermal etc 3. Recording/ Calculating your energy use	1. Ventilation systems/ fresh air 2. Windows (and blinds) 3. Air barrier and fabric 4. Heating system 5. Seasonal changes	What if? 1. It's too hot or cold 2. It's stuffy or draughty 3. The bills are too high 4. The air feels dry or damp 5. It's noisy 6. We have lots of people round or we go away for a while 7. We want to open the windows	1. Emergency actions 2. Checklist help and support

5. Examples of Good Practice for occupants

A. About your home

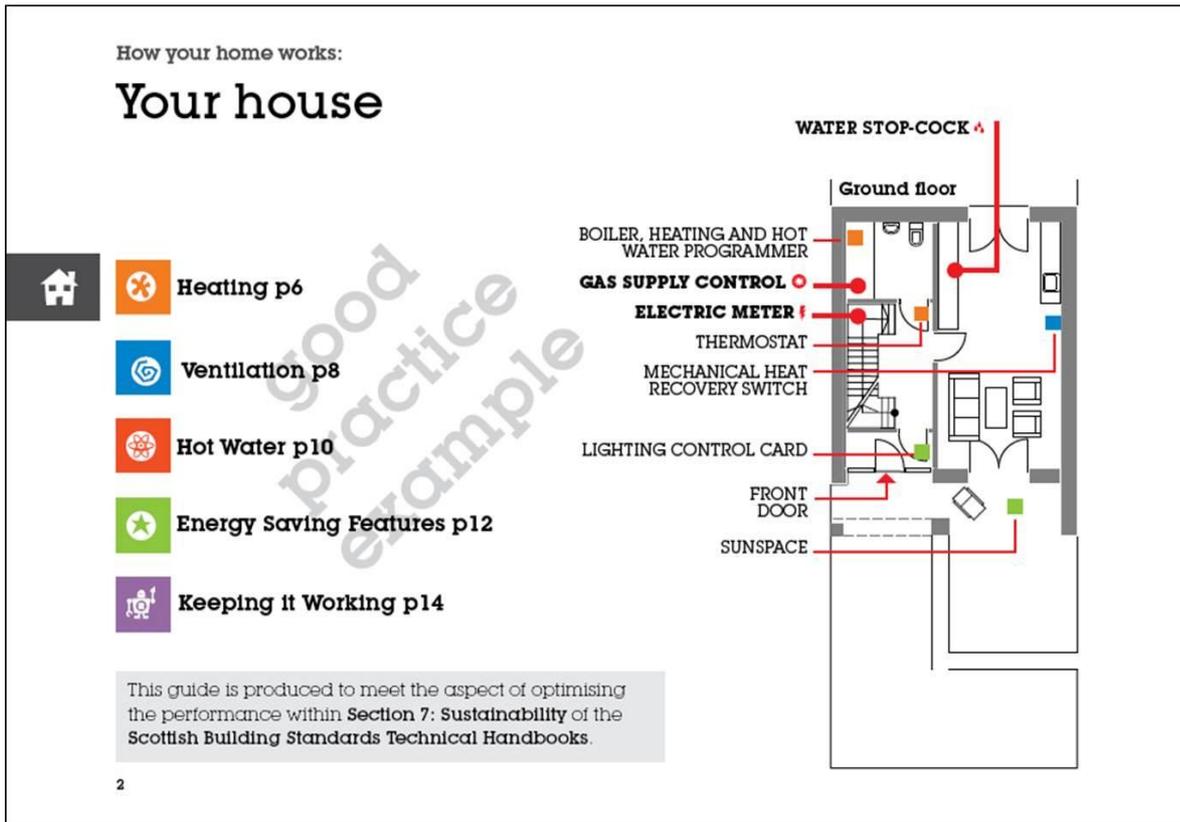


Figure 6 'How Your Low Carbon Home Works' by Scottish Building Standards for occupants

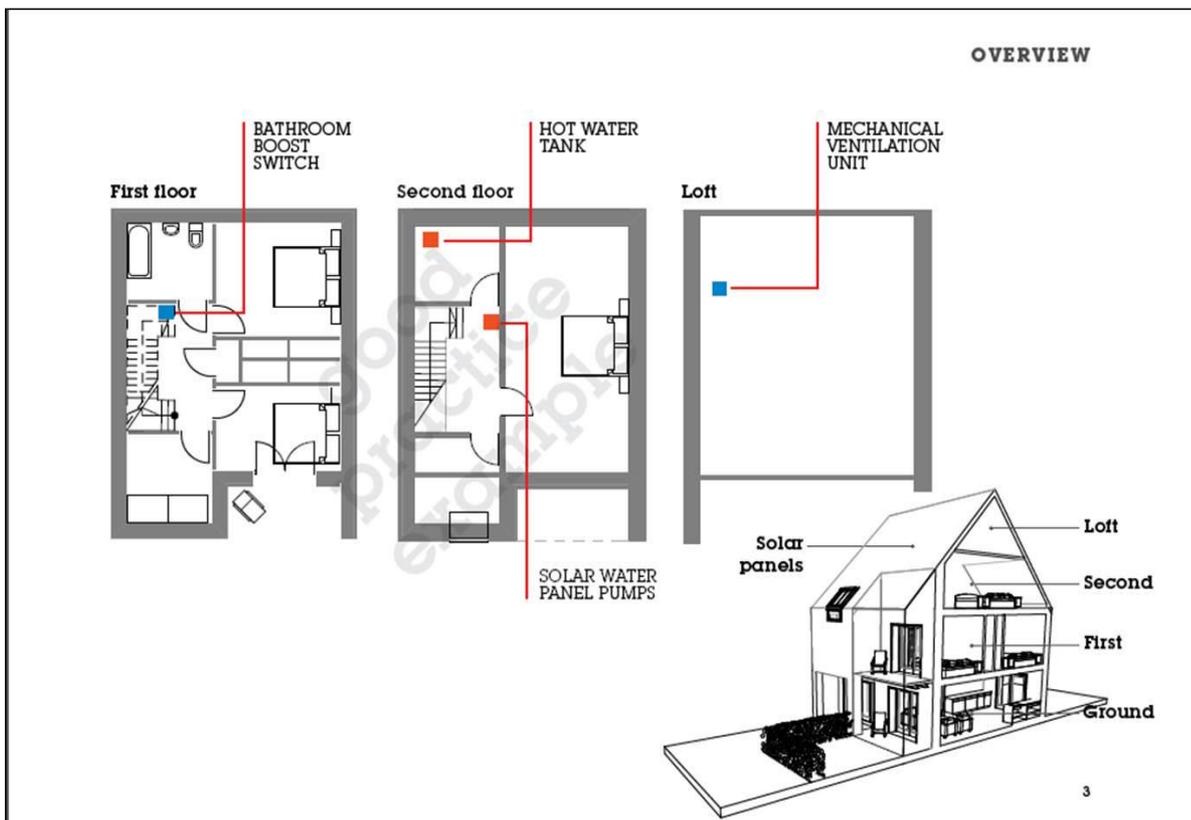


Figure 7 'How Your Low Carbon Home Works' by Scottish Building Standards for occupants

B. How to look after your home / this building

03 Energy and environmental strategy

PERFORATED PANELS

What are they and why are they here?
 The perforated panels in the offices form part of the natural ventilation strategy.

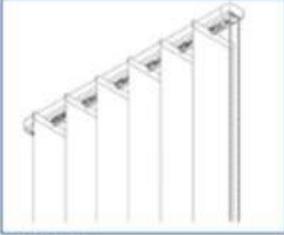
How do they work?
 Warmed air passes through the perforated panels into the extract ducts, drawing the heated air from the occupied space.

What's my part in this?
 Covering the panels will affect the performance of the natural ventilation system. The perforated panels should not be obstructed in any way.



Perforated panels

WINDOW BLINDS

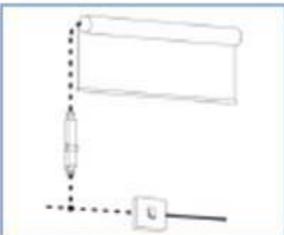


Vertical blind screen

What are they and why are they here?
 Vertical blinds in offices and meeting rooms are used to control glare and direct sunlight. The vertical blinds in the boardroom are supplemented by vertical roller blinds on the high-level windows. The blinds in the meeting rooms and boardroom also serve as blackouts for video projections and presentations.

How do they work?
 The blinds are manually controlled using a pulley, located behind each column at the end of each run. They can be rotated to the direction of the sun to allow views out whilst controlling sunlight and glare. The high-level vertical blinds in the boardroom are controlled electronically by switches.

What's my part in this?
 Only use the blinds when you need to stop glare and when necessary in meeting rooms. Closed blinds will reduce the amount of natural daylight into the offices and will result in increased use of artificial lighting and energy consumption. Ensure that slats in the blinds are left open wherever possible, as closed slats will be detrimental to the natural ventilation strategy if the vertical slats are closed against each other.



Electrical roller blind mechanism



Roller blind screen

Building user guide: Inverdee House
07

Figure 8 'Building user guide: Inverdee House' for occupants

C. What to do if ...?

FAQ type section describing what to check and what to do if it's a bit cool, or too warm, or stuffy etc.

HEATING



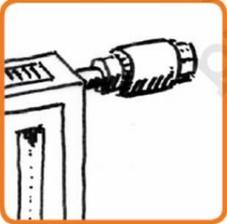
(Manufacturer and model number here)

*** Thermostat**
 LOCATION: Ground floor hallway.
 The thermostat turns the boiler off when the house has warmed up, it overrides the TRV's. Set it to the temperature that you want your hall to be, this may be lower than the temperature of your main living rooms. 18°C is comfortable.

DO learn how to set your programmer. There are instructions for this inside the boiler cover.
DO set your thermostat for a comfortable temperature
DO set your Thermostatic radiator valves to provide comfort, normally 3 or 4 is about right
DO remember to make sure the clock is changed when the clocks change

DON'T set your thermostat too high, you can save energy and money by keeping this about 20°C or 21°C
DON'T set your Thermostatic radiator valves to 5
DON'T dry clothes over radiators

MORE INFORMATION:
 See Manufacturers website at: (Website here)
 See Manufacturers website at: (Website here)



(Manufacturer and model number here)

*** Thermostatic radiator valves (TRV's)**
 LOCATION: On every radiator.
 These valves control the amount of heat coming out of individual radiators. When the room is at the right temperature they turn the valve off. If it gets cooler the radiator warms up again. The setting 1 is quite cool, 4 is warm. 5 is no warmer than 4, but means the radiator does not turn off even if it gets very warm.

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Figure 9 'How Your Low Carbon Home Works' by Scottish Building Standards for occupants

Can I open the windows in summer?

When it is summer and you are not heating your home, the windows can be opened and the mechanical ventilation heat recovery system (MVHR) can be switched to "extract-only" when needed to ventilate the bathrooms or kitchen.

What about cooking odours? Drying clothes? Steamy showers?

The MVHR has a boost facility to deal with cooking odours and steamy showers. This is controlled by a boost button in these rooms. In addition to the kitchen extract provided by the MVHR, there will be a recirculatory hood above the cooker which will also filter cooking vapours. We have provided you with an outdoor rotary drier, so you should not need a tumble drier. If you want to install a tumble dryer it must be the condensing type (or combined washer/drier), to avoid vent penetrations through the draught proof construction of the external walls. There is an airing cupboard which has a small radiator at the bottom and an exhaust to the ventilation system, to take moist air away. Normally the radiator is set to room temperature, but pressing the boost button in the cupboard turns it up for several hours to help dry clothes.



Figure 10 'Your easi guide to Passivhaus' by Gentoo for occupants

D. How to fix things

How your home works:

Keeping it working

Your house requires regular maintenance to ensure it continues to work well for many years. Poorly maintained systems tend to be more inefficient and cost more to run.

Every Month
 Wash filters in the ventilation system
 Clean sunspace windows

Every Year
 Boiler check by Registered Gas Safe Engineer
 Replace the filters in the ventilation system (insert type and manufacturer)



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Figure 11 'How Your Low Carbon Home Works' by Scottish Building Standards for occupants

KEEPING IT WORKING

Resources

Your welcome pack contains the manuals for the following equipment.

Heating

Programmer
 See Manufacturers website at: (Website here)

Boiler
 See Manufacturers website at: (Website here)

Ventilation
 See Manufacturers website at: (Website here)

Hot Water

Programmer
 See Manufacturers website at: (Website here)

Boiler
 See Manufacturers website at: (Website here)

15

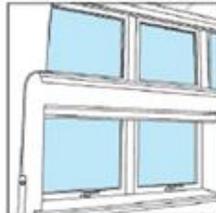
Figure 12 'How Your Low Carbon Home Works' by Scottish Building Standards for occupants

6. Examples of Good Practice for Facilities Managers

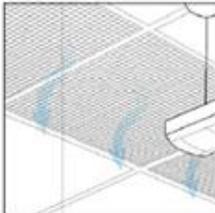
BUILDING ENVIRONMENTAL CONTROL
Heating, Cooling and Ventilation
Teaching and staff areas



Heating
Generally radiators are installed within classrooms. These radiators can be installed behind desks or cupboards or left exposed. Remember not to cover the radiators or the grilles which allow air to circulate around concealed radiators as otherwise the heating will not work. The temperature of the classroom can be controlled by adjusting the controller mounted on the exposed radiators or on the desk where the radiators are concealed. When the set temperature is reached the radiator will cool down and heat up as necessary to maintain temperature.



Cooling
In all classrooms it is possible to manually open windows to cool the room. Windows within reach are opened with the handle mounted on the frame and windows which are difficult to reach are opened with a remote window mechanism located nearby.



Ventilation
Air enters the classrooms through grilles in the ceiling. The amount of air entering the classroom is automatically controlled by the building's computer management system, although if extra cooling or ventilation is required the classroom windows can be manually opened.



Mechanical Ventilation
Several teaching areas within the school have mechanical ventilation to supplement the natural ventilation. The HEI food technology room's ventilation system is used to remove the smells and fumes associated with cooking, the craft work areas have specialist functions which require dust and fume extract and the library & learning area has a automatic fresh air supply system to help keep the area cool on warm summer days.

WHAT TO DO IF...

Too Hot?

1. Turn the radiator valve control setting down progressively.
2. Take off a layer of clothing.
3. Open the windows.

Too Cold?

1. Close the windows.
2. Put on a layer of clothing.
3. Turn the radiator control setting up progressively - Remember the setting on the dial corresponds to a temperature setting e.g. 17.0 = 21°C. The radiator will stay on until this temperature is reached.

REMEMBER!
Allow some time for each step to take effect before trying the next one.

Teaching wing cross-section: Air movement

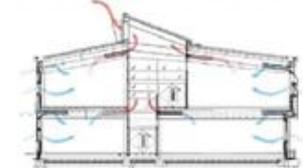
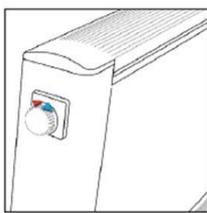


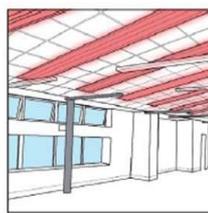
Figure 13 'Inverclyde Academy Building User Guide' by Max Fordham for occupants and Facilities Managers

BUILDING ENVIRONMENTAL CONTROL
Heating, Cooling and Ventilation
Around the School

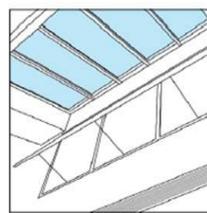
REMEMBER!
Lowering the heating setpoint lowers the buildings energy use.



Heating
Many rooms have radiators to provide heating. The room temperature can be controlled by adjusting the setting on the radiator valve.



Heating
Several areas around the school have radiant heating. This type of heating utilises heated panels in the ceiling to warm the users of a space. Radiant heating is used in the sports and gym halls, the library and the drama studio. Heating control in these spaces is automatic.



Ventilation
Many spaces have computer controlled ventilation. In most of the occupied spaces, operable windows are provided so most building users can increase the ventilation rate by opening these. In the large main spaces such as the Assembly Hall, Games Hall, Gym, dining, social area and the circulation areas, the ventilation is controlled by opening and closing vents and windows automatically. In Winter to improve energy efficiency, fans are used to ventilate the Assembly Hall and dining area to utilise heat recovery.

WHAT TO DO IF...

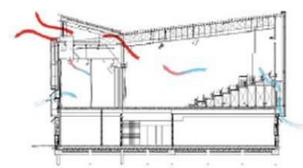
Too Hot?

1. Take off a layer of clothing.
2. Open windows
3. If persistently too warm, ask the janitor to adjust the heating settings.

Too Cold?

1. Close the windows.
2. Put on a layer of clothing.
3. If persistently too cold, ask the janitor to adjust the temperature settings.

Assembly hall cross-section: Air movement



Hub area cross-section: Air movement



Figure 14 'Inverclyde Academy Building User Guide' by Max Fordham for occupants and Facilities Managers

Acknowledgements

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