Passivhaus in the UK
Nick Grant, Technical Director, UK Passivhaus Trust
Principal, Elemental Solutions

PHNW Conference
Portland

27th March 2014
Passivhaus in the UK

1. The Passivhaus Trust
2. Some UK pioneer projects
3. Design lessons I have learnt
4. Future challenges
5. Experience of larger projects - later
1. The Passivhaus Trust

Structure
The Passivhaus Trust is:

1: A not-for-profit organisation launched July 2010

2: A subsidiary company of the AECB

3: The UK affiliate of the PassivHaus Institute, through the International Passive House Association (iPHA)

www.passivhauustrust.org.uk
Aims and objectives
The Passivhaus Trust aims to:

1: Preserve the integrity of Passivhaus standards and methodology

2: Promote Passivhaus principles to the industry and Government

3: Undertake research and development on Passivhaus standards in the UK
The Passivhaus Trust

Activities

The Passivhaus Trust runs a core programme:

1: Research and guidance
   - technical working groups
   e.g. costing, IHGs, QA, user guides etc

2: Education and training
   - introductory events, site visits &
   technical masterclasses

3: Policy, lobbying & promotion
   - relationship of PH to UK policy e.g. zero carbon definitions
Passivhaus Claims

Clear & easily verifiable

- blower door
- thermography
- PHPP
- components & materials

Trades description

- fake goods
- consumer law
- annoys those doing it properly

Claiming The Passivhaus Standard
free download: www.passivhaustrust.org.uk
The Board

Chris Herring,
Chair PHT
Green Building Store

Nick Grant
Elemental Solutions

Paul Ellis
Ecology Building Society.

Marion Baeli
Paul Davis & Partners

Paul Tuohy
Strathclyde University

Peter Wilkinson
EcoDesign

Lynne Sullivan
Sustainable by Design
The team

Jon Bootland
CEO

Kym Mead
Associate Director

Kirsten Priebe
Membership & Development Associate

Yogini Patel
Design & Communication Coordinator

Roger Southcott
Membership & Events Coordinator
Patron members
2. Passivhaus in the UK 2008 – 2013

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Passivhaus in the UK
- We started 17 years behind!

Images: Passivhaus Institut, JPW Construction, Green Building Company, Bere architects, Simmonds.Mills
The First Certified Passivhaus Domestic Project in the UK

Y-Foel, Machynlleth, Wales, 2008
Mark Tiramani & JPW Construction
UK Passivhaus 2013

- 250 Certified buildings, more underway
- Over 20 certified non-domestic buildings

Map and database:

http://passivhausbuildings.org.uk
Everyone a winner
A flurry of firsts!
The First Certified Passivhaus Office in the UK

Canolfan Hyddgen, Machynlleth, Wales
JPW Construction
The First Certified Passivhaus Domestic Project in England

Underhill House, Moreton-in-Marsh
Helen Seymour-Smith Architects
The First Certified Passivhaus with traditional cavity wall

Denby Dale
Green Building Company
The First Certified Community Centre in England

Centre for Disability Studies, Essex
Simmonds Mills Architects
The First Certified Passivhaus Education building in the UK

Hadlow College, Kent
Eurobuild

Passivhaus Trust
The UK Passive House Organisation
The first rural social housing PH scheme in the UK
Dormont Estate, Lockerbie

Scottish Passive House Centre
The first certified Passivhaus schools in the UK

Oakmeadow, Bushbury Hills, Montgomery, Primary schools, Wolverhampton and Exeter
The first certified domestic Passivhaus retrofit in the UK

100 Princedale Road, London (Passivhaus not Enerphit)
The first certified EnerPHit house in the UK (4th in the world!)

Grove cottage, Hereford
Simmonds.mills Architects
The first certified Co-Housing

Lancaster Co Housing - 41 units
Eco-Arc Architects
“I have been anti-Passivhaus for a long time. I have always preferred ‘naturally’ ventilated buildings… But I seem to have ended up here by accident . . . As there was nowhere else to go, really.”

Andrew Yeats, Eco-Arc
Architect of the Lancaster scheme
UK Technical Innovations

Traditional cavity construction details
School kitchens
Multivent zone PHPP sheets
Hot water losses and summer gains
Design PH
Passivhaus claims paper, Passivhaus Trust
IHG and dwelling size, the small Passivhaus ‘problem’ solved!
3. Passivhaus Design Lessons Learnt

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Opportunity management

“All the important design mistakes are made on the first day”
Amory Lovins

Greatest opportunity for change

Least opportunity for change

Opportunity

Time

Brief
Start Design
Planning permission
Technical design
Start construction
Handover

If you can imagine it, you can create it.

Set your imagination free – and bring your most amazing ideas to life – with Dell Precision™ certified workstations.
Drawing and building are different things. Just because you can draw a dog with six f*****g legs doesn't mean I can just whip one up.
Design: embrace constraints
The natural world is very constrained, that’s why it all all has a Darwinian style.
About 400,000 species of beetle – none have wheels
Learning from nature

“Dad, you can’t improve on nature”
- Lisa Simpson, Intern, International Living Building Institute

“But Lisa, what about a monkey in a cowboy outfit, or chocolate coated peanuts?”
- Homer Simpson, Nuclear Engineer & amateur philosopher.
In the eye of the beholder

We can overcome many constraints:
By spending lots of our time and the client’s money and energy.
This is not a Passivhaus Issue, it is a physics issue.

If your goal is cost effective sustainable buildings then keep irony outside the thermal envelope.

Chester Balmore 50+ Passivhaus flats in London; Photo Elrond Burrell
A dog with 6 legs might have been easier to build.
Design: golden rules

Passivhaus ≠ Passive Solar
Optimise window areas for daylight and ventilation; refine for solar gains.

‘Free’ passive solar heat is very expensive (10 X the price of gas!)
- But free if you needed the window anyway!
See Martin Holladay’s excellent presentation passive solar v superinsulation
Design: golden rules

Design a building like an onion to avoid tears

- Structural zone
- Services zone
- Air barrier layer
- Insulation zone
- Weather tight layer
- External structural zone

Nick Grant
Design: golden rules

Avoid unnecessary penetrations – 2 good examples

Photo; Mike Whitfield Construction
Bushbury School, photo Nick Grant
Typical Green Building Services

- Thermal store
- Solar pump
- Heating pump
- Solar controls
- Under-floor controls
- Stove pump
- DHW pump
- Heating manifold
- Pipes to gas boiler

Alan Clarke
All that kit: £20,000

Life of 20 years: £1000/year + fuel + maintenance.

Heat + hot water: 5,000kWh/year
Gas @ 6p/kWh: £300/year

😊

Slide courtesy Alan Clarke, UK Passivhaus Conference 2013
Passivhaus heating conclusion:

Expensive fabric = cheap heating
Keep the services simple

Gas Combi or system boiler and a few radiators
  Cheap, simple, familiar, easy to control with TRVs.

Heat Pumps
  Once grid is de-carbonised, until then an expensive way to heat
  with gas, coal and oil.

‘Zero carbon fuels’ - no magic bullets
  Boundary is wider than the building.
  If I use it someone else can’t.

Net zero –
‘Magic electron math’ Mike Eliason
Learning through feedback

New client  Exciting new ideas  New construction  New contractor  New mistakes

Flee into the future and don’t look back!!

Over-budget, not quite working so don’t look for trouble!

Learn and improve  Feed into next project

Test and Feedback  Look for problems

Better building, happy team, repeat work
“Insanity: doing the same thing over and over again and expecting different results.”

Albert Einstein
4. Future challenges

Technical:
- Radical cost efficiency measures
  - glazing
  - doors
- ventilation - easier install & commissioning
- Small dwelling and IHGs

Other:
- Maintaining quality of the ‘brand’
- Educating designers
“Making the simple complicated is commonplace, making the complicated simple – that’s creativity”  

Charlie Mingus
The last word

Bronwyn Barry
Founding Board Member Passive House California

“Passivhaus gets better with practice. Do you remember the first time you had sex?”