Why Choose Passivhaus?

Passivhaus Trust
The UK Passive House Organisation

Jon Bootland
Passivhaus Trust

Passivhaus Trust The Foundry, 5 Baldwin Terrace, London N1 7RU Tel: 0207 704 3502
Email: info@passivhaustrust.org.uk Web: www.passivhaustrust.org.uk

Underhill House: Seymour-Smith Architects

Built environment impacts

How much of the UK's CO_2 emissions are caused by buildings in use?

10% **25%** **43%** **50%** **75%** **100%**

Housing impacts

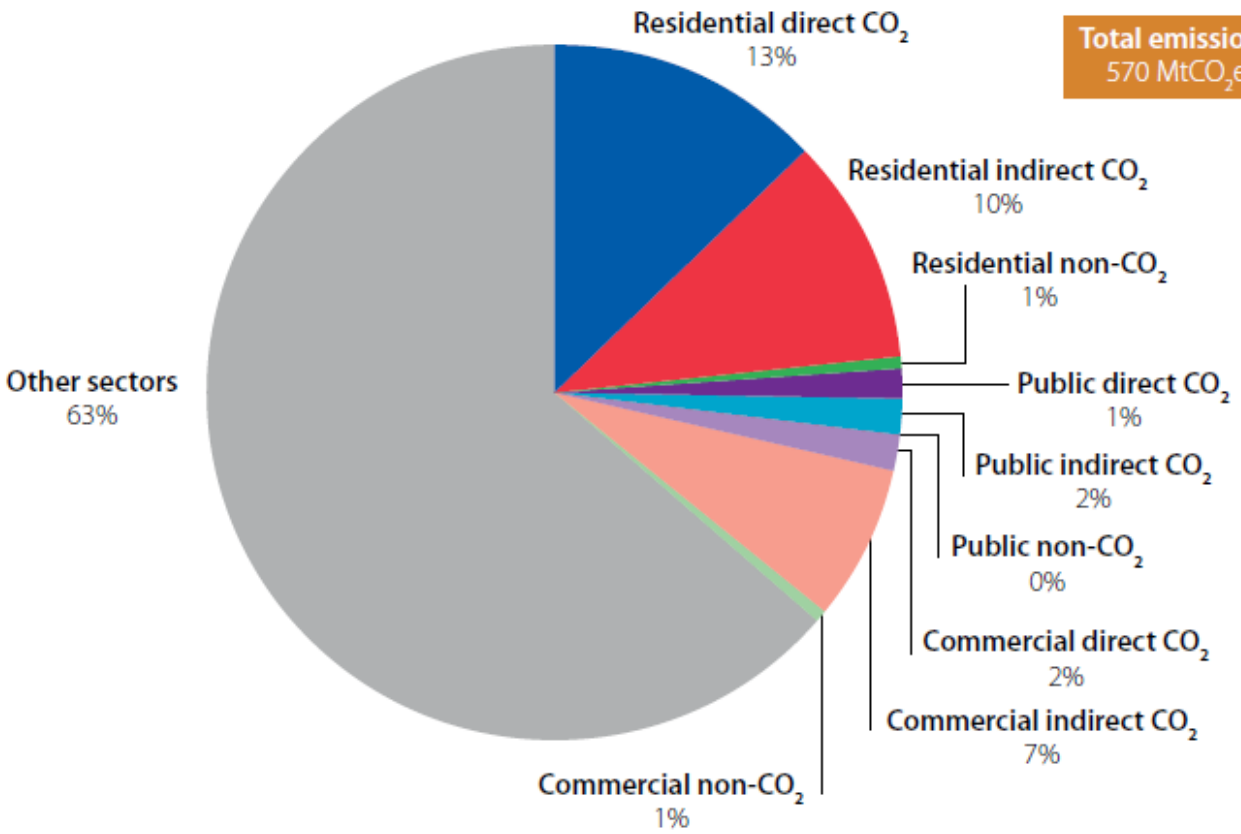
How much of the UK's CO_2 emissions are caused by homes in use?

10% **25%** 50% 75% 100%

Official figures (UKCCC)

Passivhaus Trust

Figure 3.1: GHG Emissions from buildings in the context of total UK emissions (2012)



Source: NAEI (2013), DECC (2013), *Energy Trends*, March 2013, DECC (2012) DUKES; CCC calculations.
Notes: 2012 emission estimates are provisional. Commercial sector and non-CO_2 are based on CCC estimates.

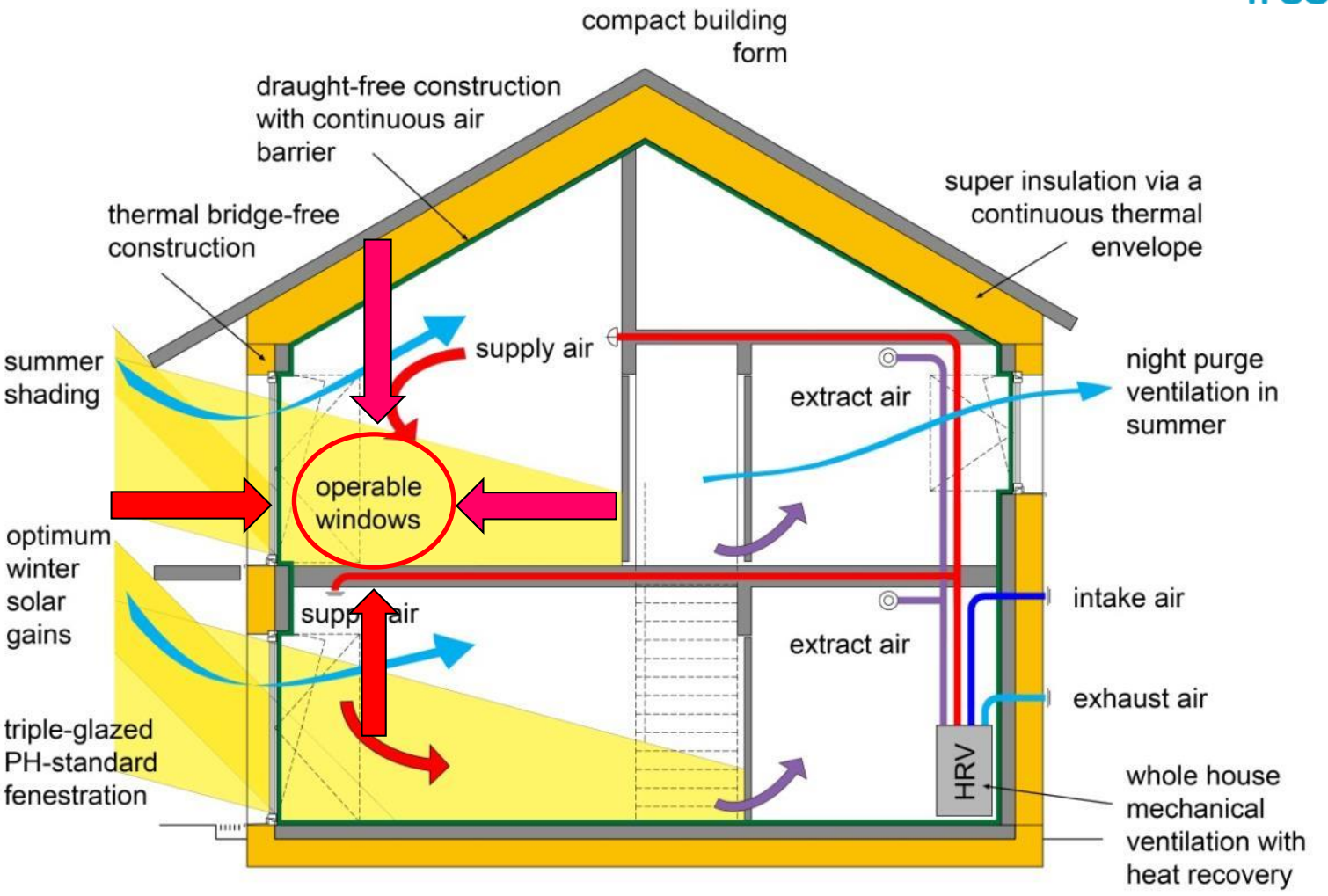
What is Passivhaus?

Energy Savings and Improved Comfort & Health

Passivhaus is the leading international low energy, design standard.

Simmonds.Mills / Thermal Inspections Ltd.

What is Passivhaus?



What is Passivhaus?

A quality assured process with Certification for:

- Buildings
  - Through UK based certifiers
- Products / Components
  - Through Passive House Institute
  - Is a demonstration of performance but not required (except for MVHR systems)
- Designers / Consultants
  - Through CEPH courses
  - List of CEPH designers / consultants on the PH Trust website
- Tradesmen / Installers
  - Through Certified Tradesman courses

International Standard

- Developed by Dr. Wolfgang Feist and Prof. Bo Adamson in the 1980s
- Over 60,000 Passivhaus projects have been completed world-wide.
- Passivhaus is now the leading international low-energy standard.
- It is a building concept that can be adopted by anyone

Passivhaus Timeline

The world's first Passivhaus is built in Darmstadt

1991

The Passivhaus Institut is founded by Dr. Wolfgang Feist

1996

The first Passivhaus in the UK is built in Machynlleth

2009

The Passivhaus Trust is founded to promote PH in the UK

2010

UK Passivhaus 2017

>800 complete, >1000 underway

In the UK:

- Almost 100 projects certified
- More than 800 buildings certified
- More than 1000 buildings underway
- Largest site underway is 400 units (apartments)
- Largest complete site so far is 65 units (Saffron Acres, Leicester)

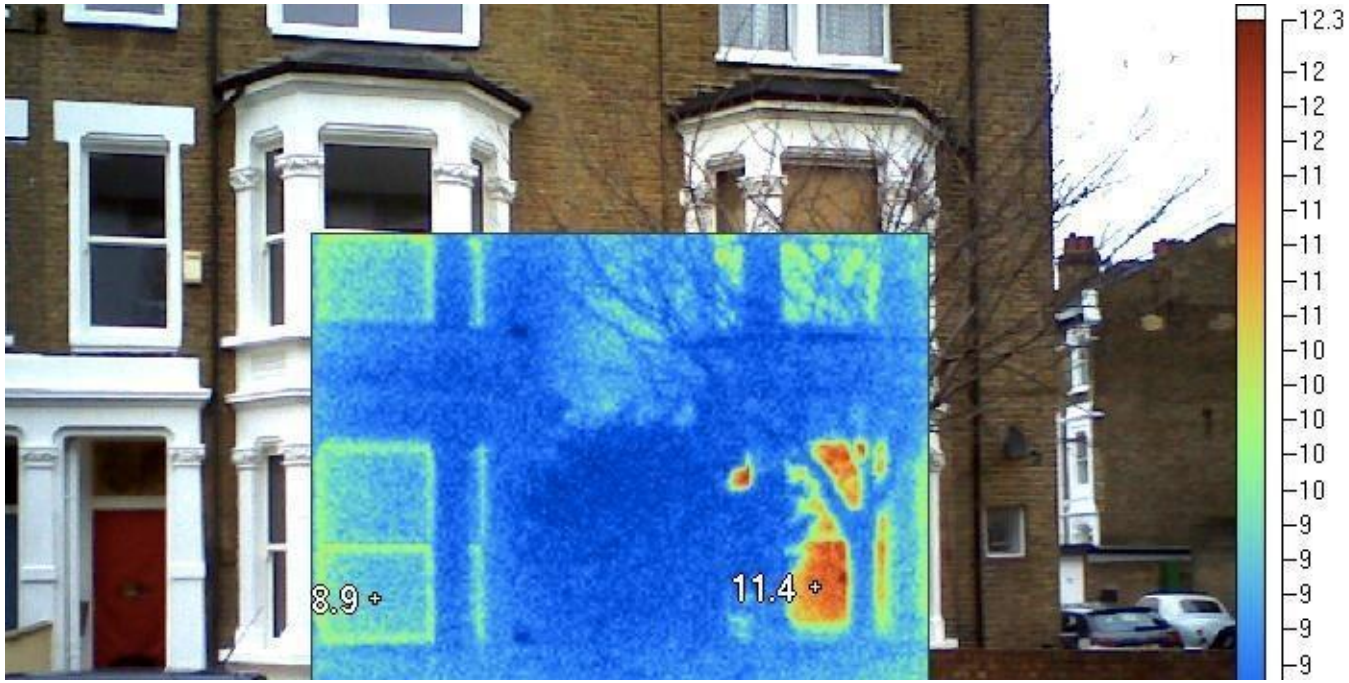
Not just housing

The Passivhaus standard is not confined to residential properties and has been achieved in several office buildings, schools, supermarkets etc around Europe.

Also refurbishment

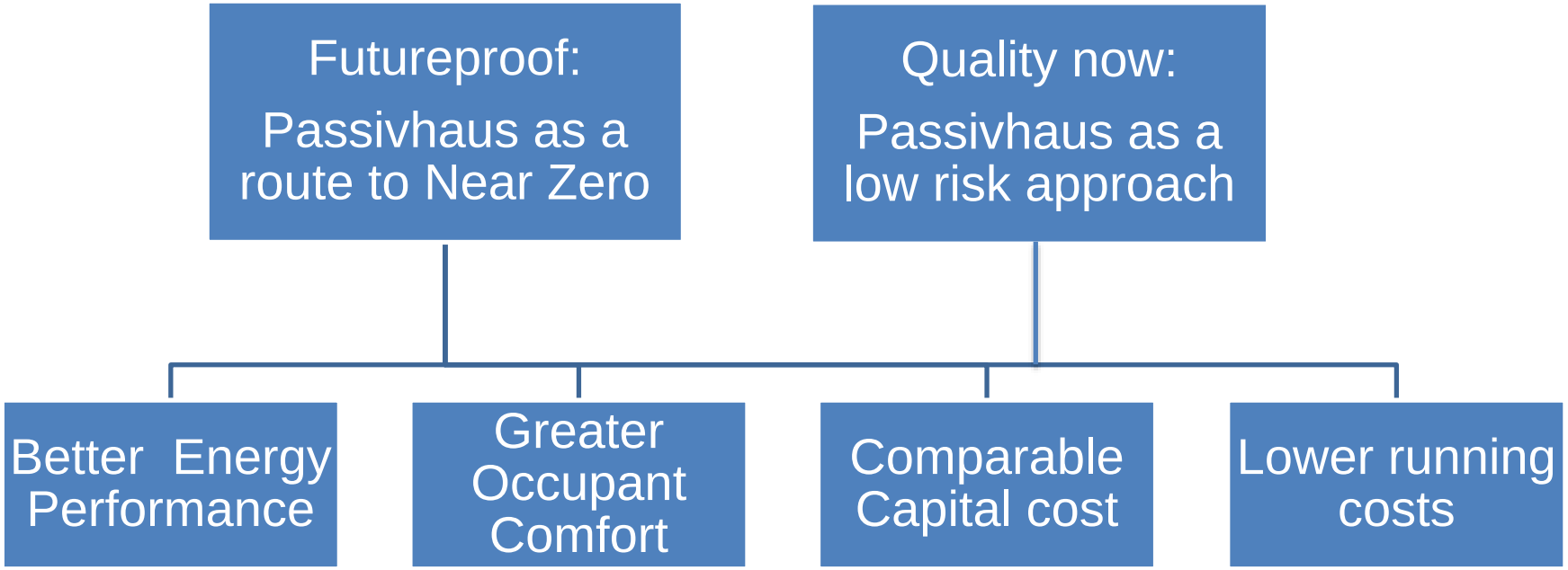
“Quality-Approved Energy Retrofit with Passive House Components”

The goal was to create a standard for an economically and ecologically optimal energy retrofit, for old buildings that cannot achieve Passive House Standard with reasonable effort. (PHI)



Lena Gardens

Why choose Passivhaus?



Why choose Passivhaus?

Passivhaus Trust
The UK Passive House Organisation

There are three major quality challenges presently facing the UK house-building industry:

Many conventional buildings designed and built in the past few years are demonstrating a performance gap in terms of:

a. energy use
b. ventilation and indoor air quality
c. thermal comfort and overheating

Denby Dale – Photo: Green Building Store

Performance gap for energy use in new homes

How much more energy does a typical new home use for heating, compared to its design target?

+10% + 25% +50% +75% +100%

Y Foel, the first Certified PH project in the UK
North Wales (2006/7)

Measured performance:

Primary energy demand: 80 kWh/m²/yr

Space heating demand 14.8 kWh/m²/yr (£130/yr gas bill)

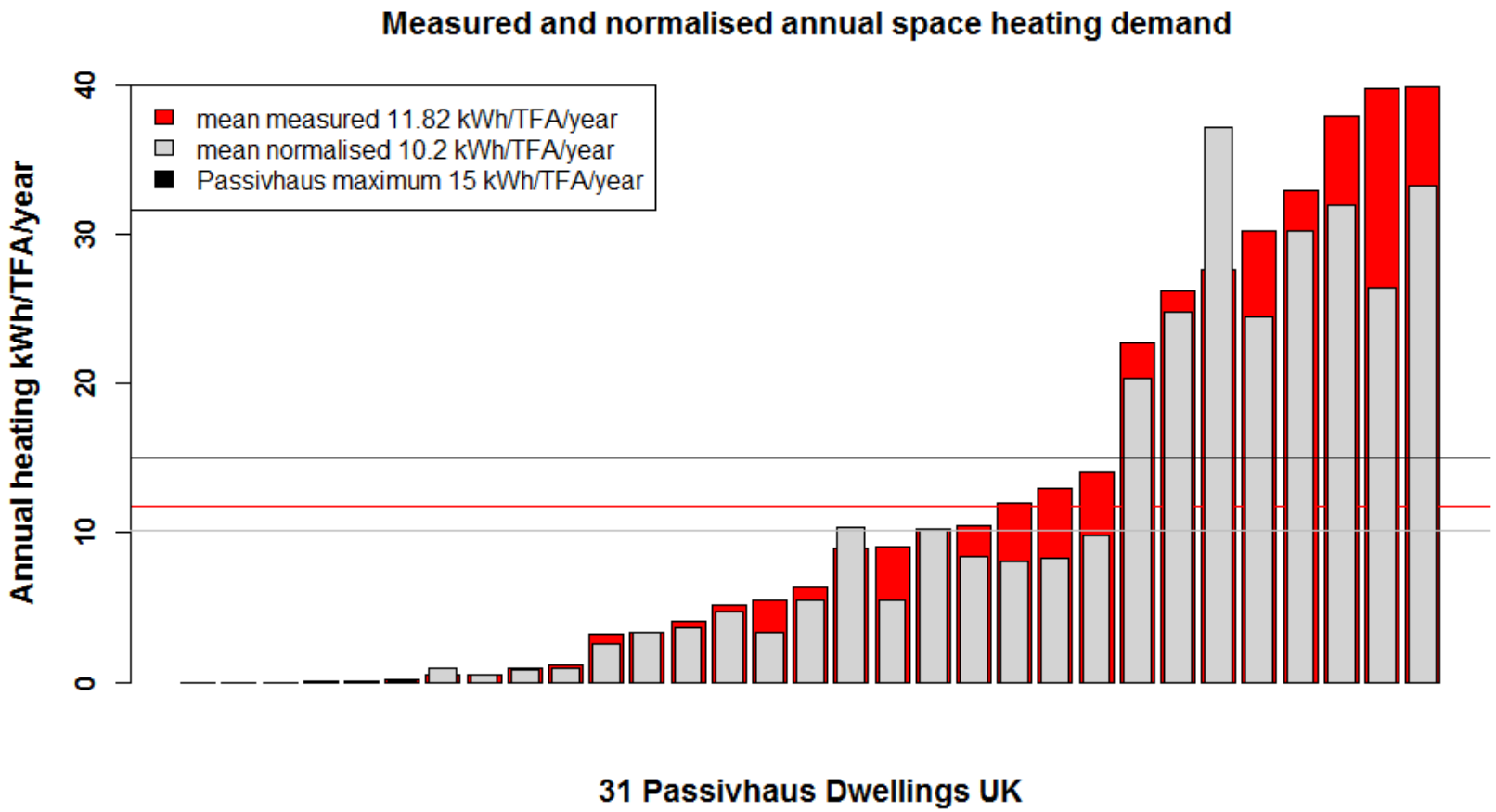
Internal temperatures never below 20° C or over 26° C

Canolfan Hyddgen, the first Non-domestic PH project in the UK

North Wales (2008)

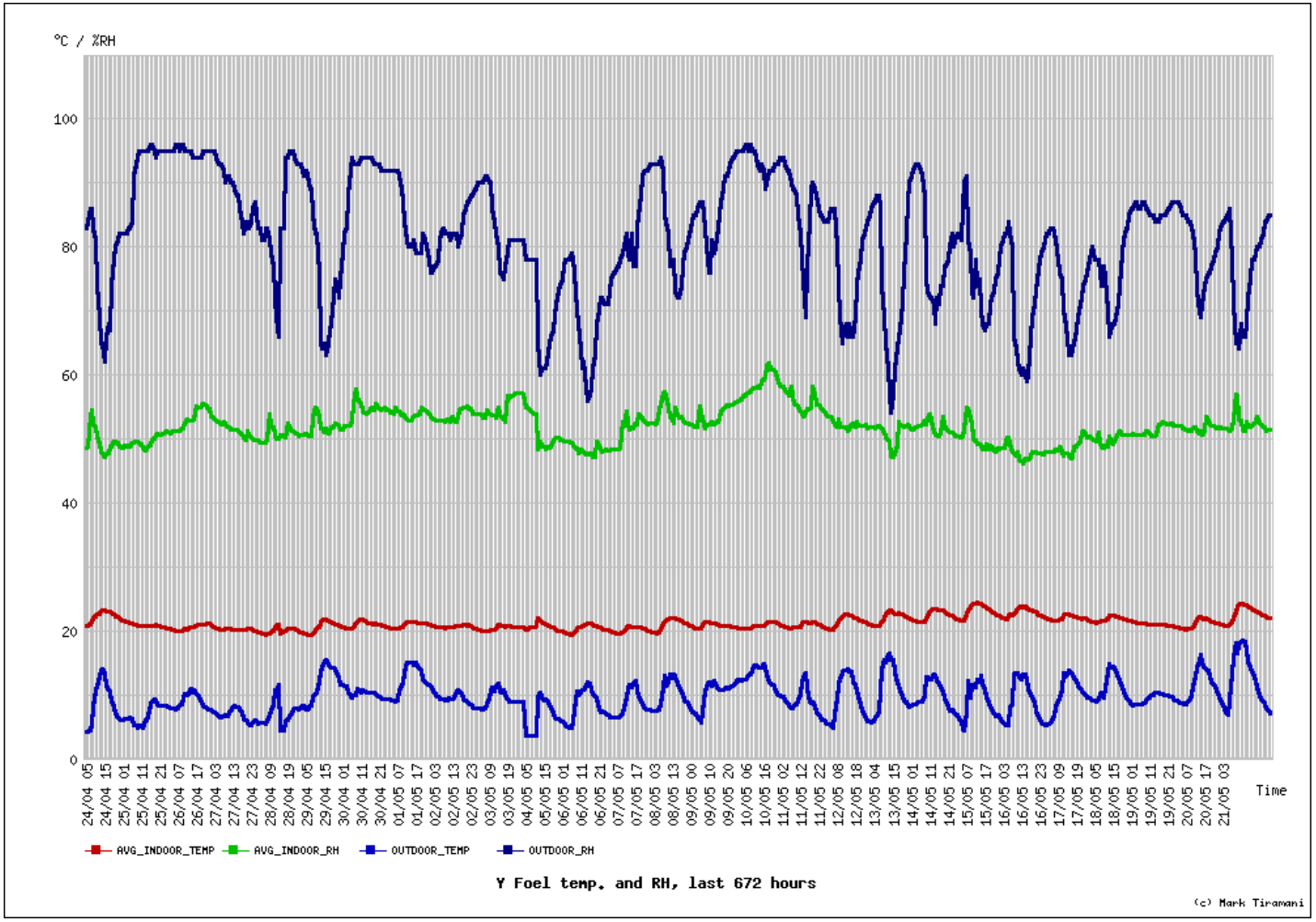
Better energy performance

UK Measured Data (Bath University)



Greater occupant comfort

Passivhaus Trust
The UK Passive House Organisation



Y Foel: Constant indoor temp, Consistent relative humidity between 40 and 60%.

Ventilation & healthy indoor air

In new homes tested for DCLG in 2010, how many ventilation systems delivered the required air change rate?

10% **25%** **50%** **100%**

Ventilation & healthy indoor air

In equivalent tests on Passivhaus new homes, how many ventilation systems delivered the required air changes?

10% **25%** **50%** **>80%** **100%**

Overheating

What the hell is going on?

Summer comfort

What temperature do regulators consider to be dangerous to vulnerable occupants (elderly, sick, young)?

20°C **25°C** 25-26°C **30°C** **35°C**

Overheating

We know the problems:

1. **Single-aspect apartments**
2. **Solar gains from West and South facades**
3. **Heat gains from uninsulated pipework & equipment**
4. **Night-time ventilation difficulties (noise, security, midges!)**
5. **Occupancy levels……**

Passivhaus already addresses the first three items in its calculation software; we encourage practitioners to design the others out! We want to ensure that overheating is almost impossible in Passivhaus homes in the UK

Lower running costs

How much does it cost to heat a typical new home (2-3 bedroom terrace, 2010 building regs) for one year?

£100 £200 £300 £400 £500

Passivhaus running costs

How much does it cost to heat a typical Passivhaus home (2-3 bedroom terrace) for one year?

£100 **£200** **£300** **£400** **£500**

Why invest in Passivhaus?

Higher quality:

Insulation, high performance triple glazed windows, ventilation with heat recovery.

Operational cost savings:

Reduced cost of heating systems, heating bills typically reduced by 90%

Plus extra value:

Health and comfort benefits; lower voids

and

LOWER RISK:

No performance gap, good ventilation, avoid serious overheating risks.

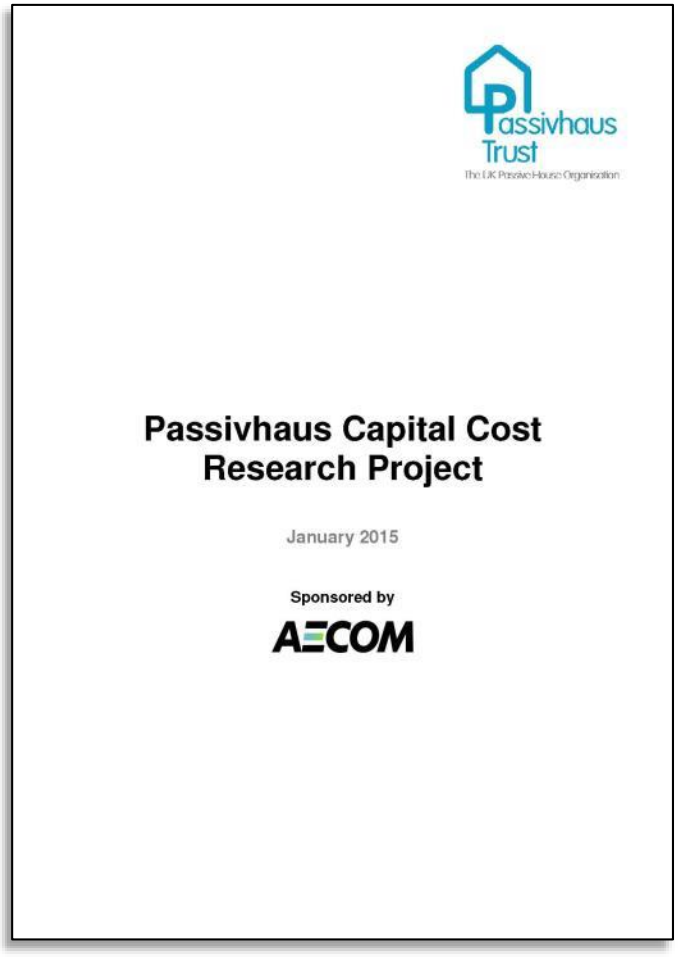
Bushbury Hills Primary School: Architype

Capital costs

From 2012-2015 there was an extra capital cost for new-build housing of 12 to 20%, depending on size, orientation etc.

Exeter City Council schemes 2-3 onwards: no additional cost....

….but you have to aim for that from the start.



Future costs

Recent figures show the additional cost coming down, as people become more experienced with using Passivhaus. By 2020, the costs should be comparable with other approaches.

Any move to Zero Carbon would elevate costs above the Passivhaus standard, PH would be a low-risk route to achieving Zero CO2!

Exeter City Council
9 schemes >100 units

Knights Place,
Exeter City Council (Gale & Snowden)

Hastoe Homes
11 schemes >100 units

Cameron Close, Isle of Wight

16 new Passivhaus homes

Norwich City Council
6 sites >200 units

Passivhaus Trust
The UK Passive House Organisation

6 sites across the city

e.g. 105 new Passivhaus homes

Camden Council
2nd Project

Agar Grove, Camden

Passivhaus Trust
The UK Passive House Organisation

Existing:
249 homes

Proposed:
493 homes

What next?

1. Commit to starting a Passivhaus project!

2. The Trust will help you. We are:

- **A not-for-profit organisation**
- **The UK affiliate of the PassivHaus Institute**

3. Join in and learn from others