# 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

# Alaska's Glacier Bay, 1941

Passivhaus Trust

# Alaska's Glacier Bay, 2004

Passivhaus Trust

USGS / Bruce Molnia

# Built environment impacts

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

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

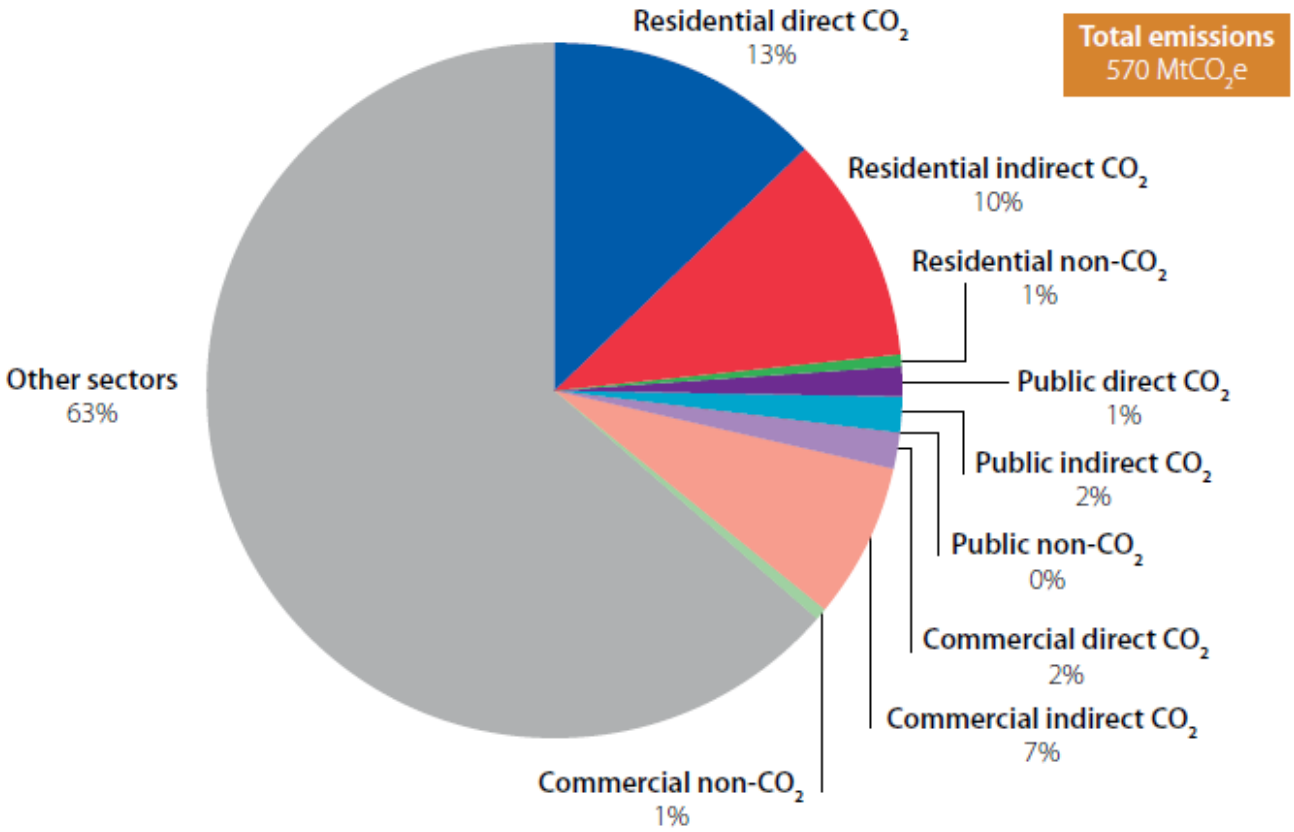
# Housing impacts

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

10% 25% 50% 75% 100%

# Official figures (UKCCC)

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.

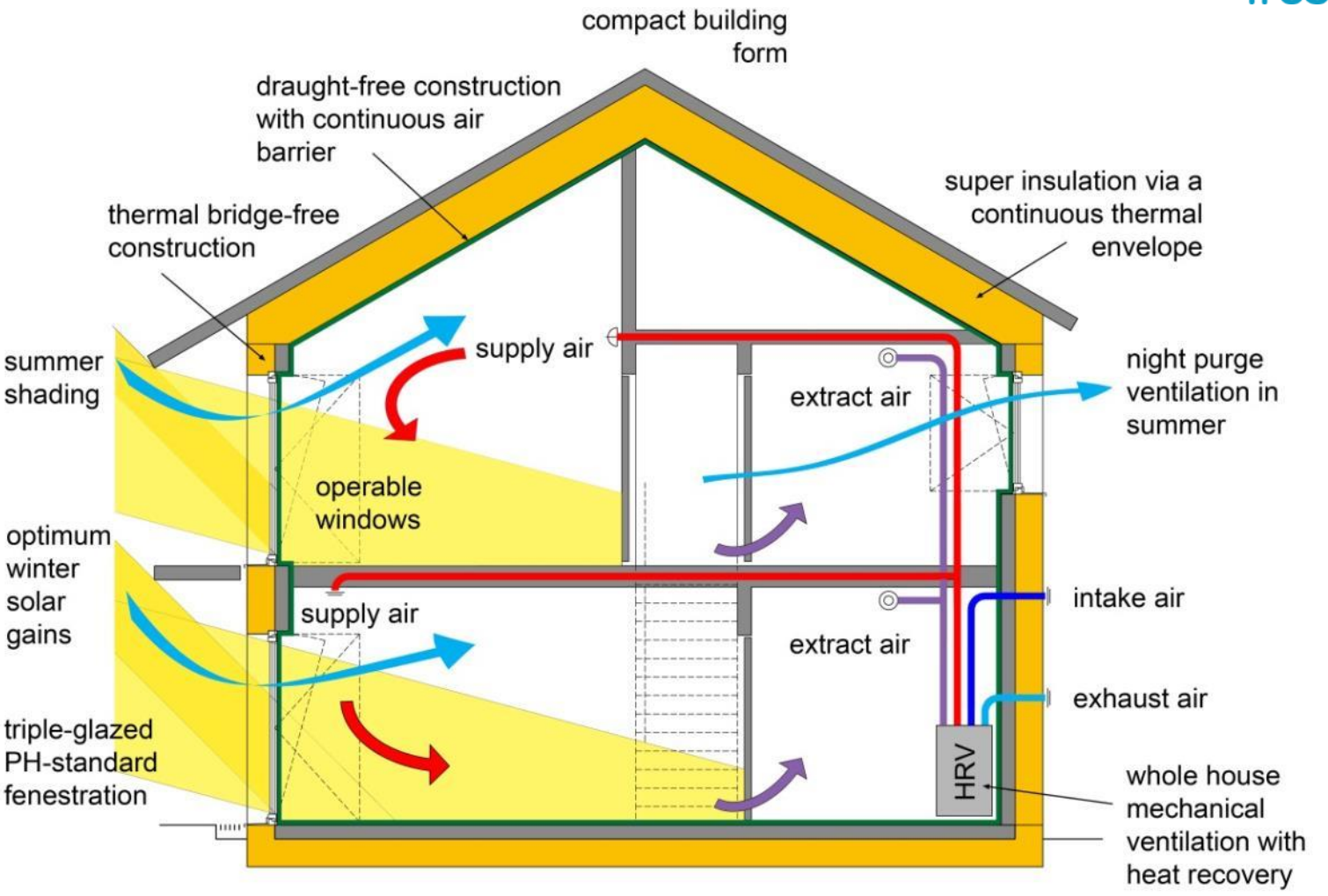
# What is Passivhaus?

## 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 50,000 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

## >500 complete, >1000 underway

### In the UK:

- Almost 100 projects certified
- More than 500 buildings certified
- More than 1000 buildings underway
- Largest site underway is 400 units (apartments)
- Largest complete site so far is 51 units (Rainham, Essex)

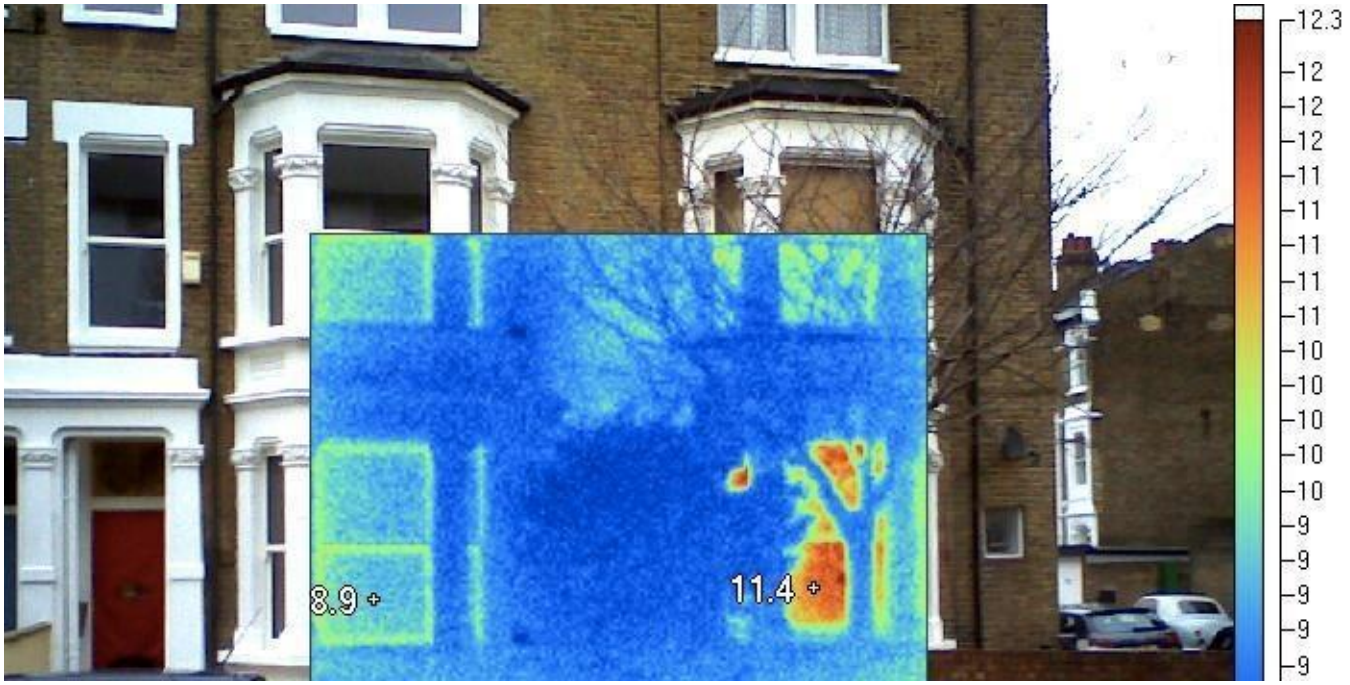
# Not just housing

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

# Also refurbishment

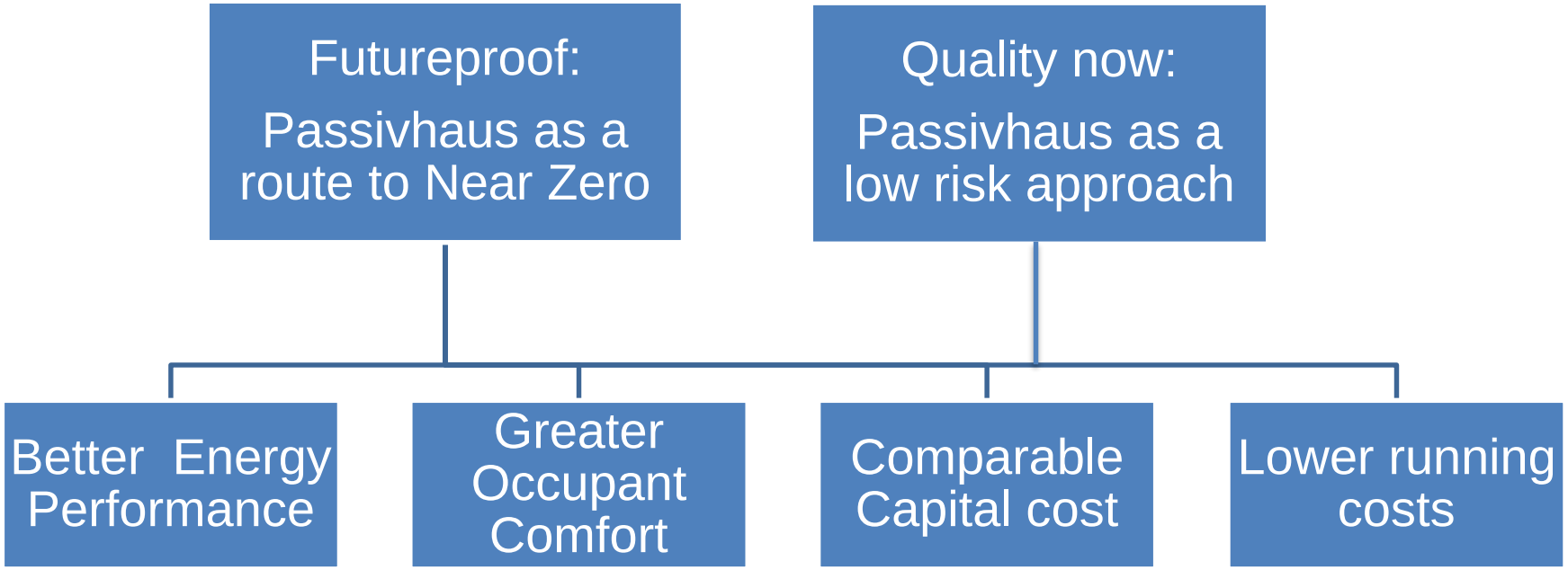
**“Quality-Approved Energy Retrofit with Passive House Components”**

*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

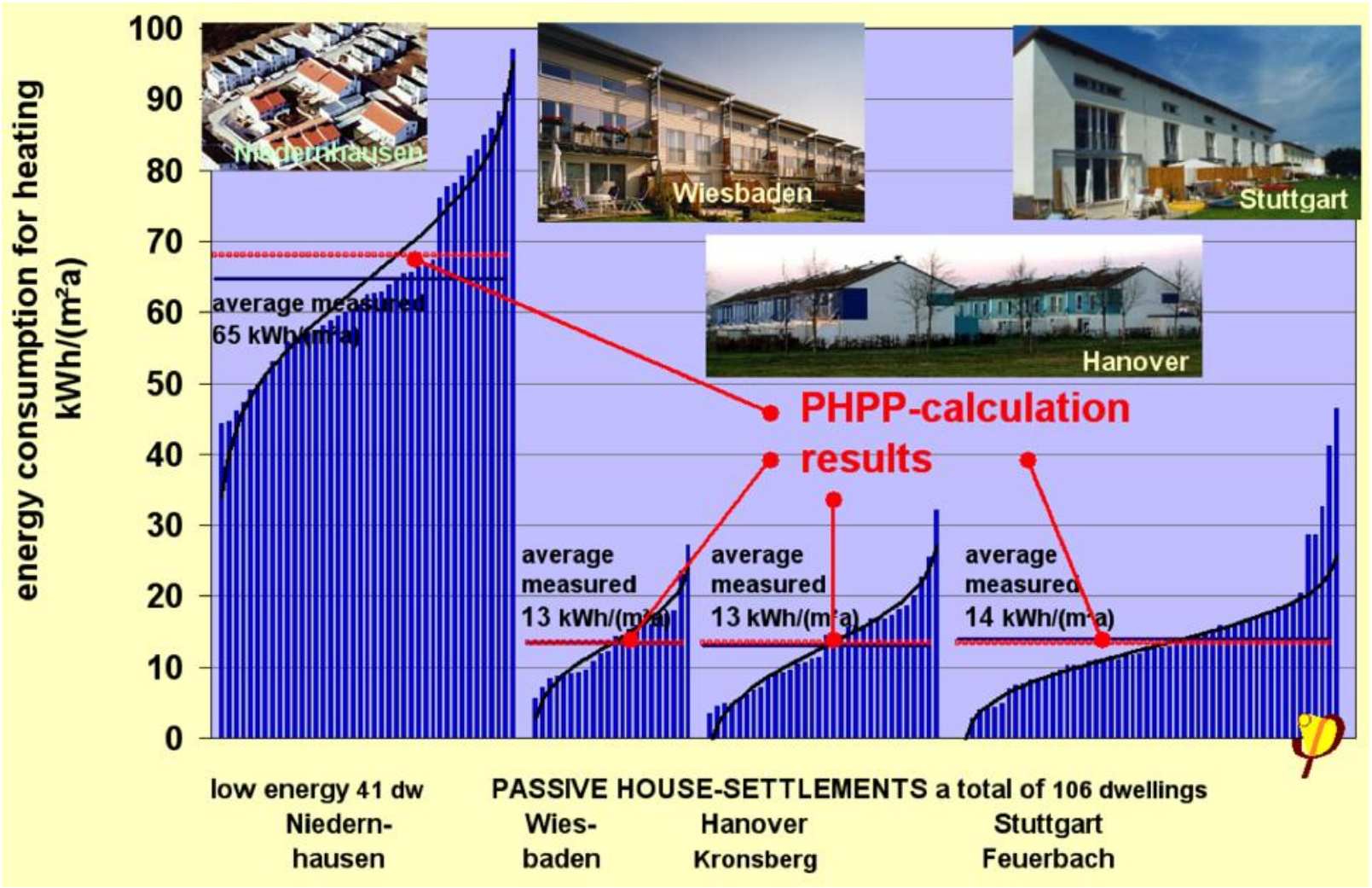
Denby Dale – Photo: Green Building Store

# 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%**

# Better energy performance




**Figures show that for Passivhaus the average heat energy use is 15kWhr/m²/yr**


**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)

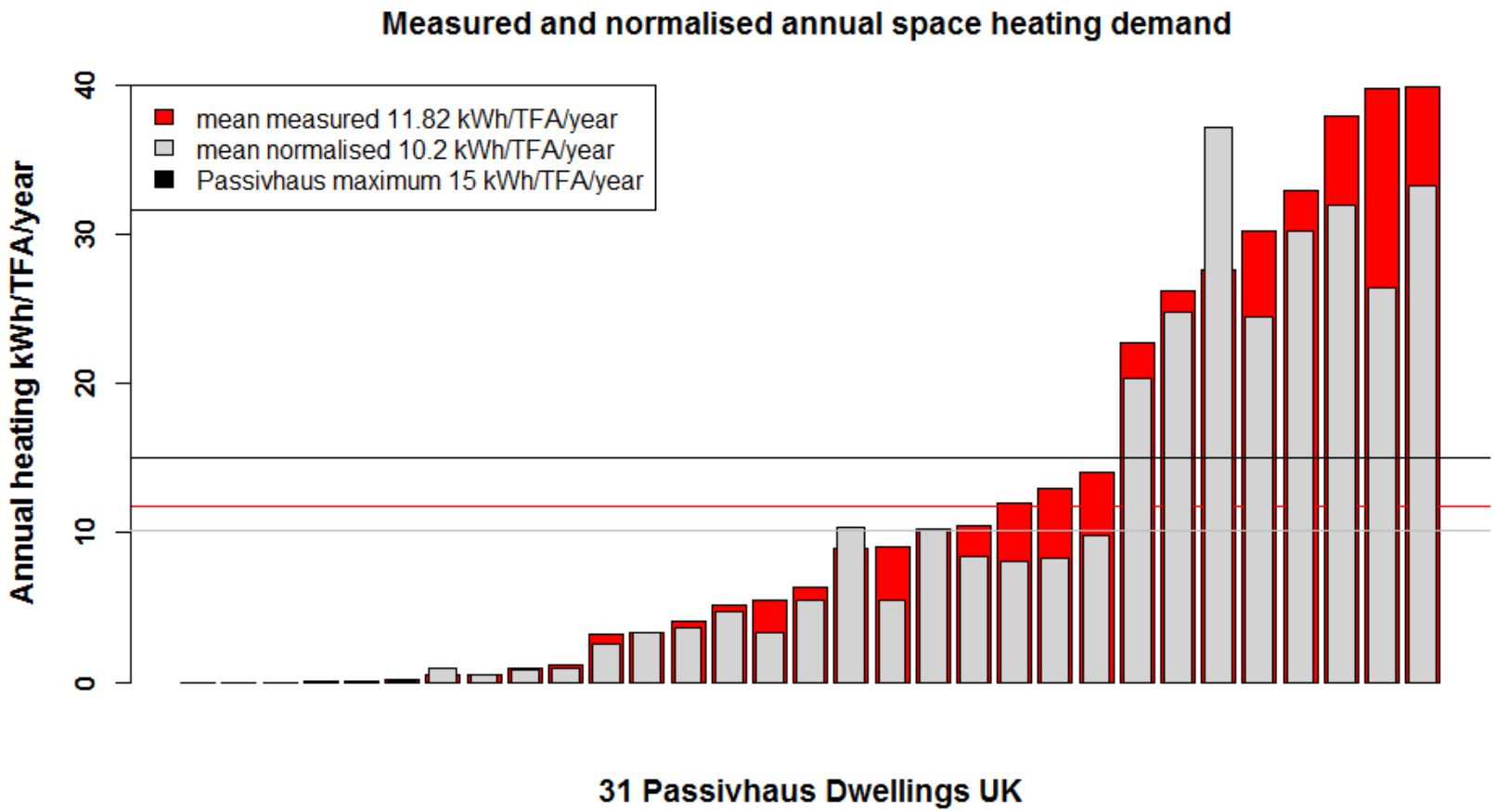
Internal temperatures never below 20° C or over 26° C

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

**North Wales (2008)**

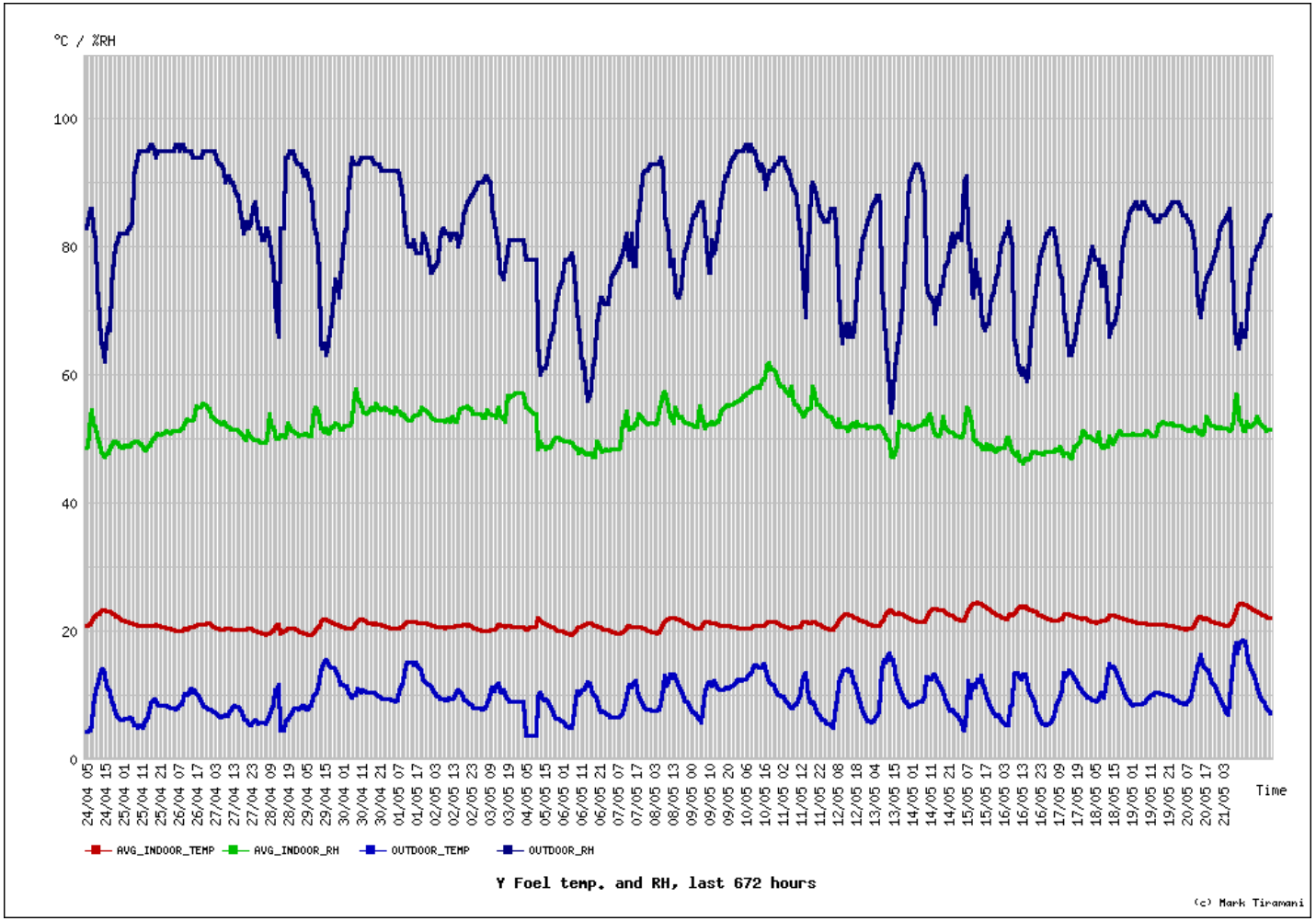
# Better energy performance

## UK Measured Data (Rachel Mitchell)



# 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?

Passivhaus Trust

THE SUNDAY TIMES

NEWS | SPORT | BUSINESS | COMMENT | NEWS REVIEW | CULTURE | STYLE | TRAVEL

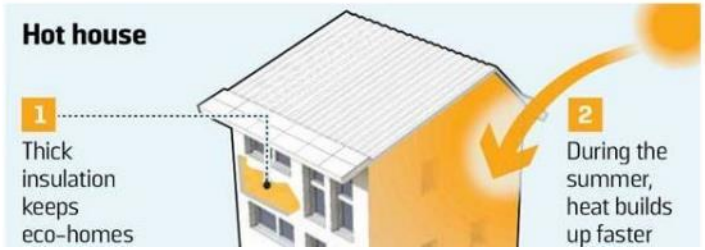
HOME / NEWS / UK NEWS / GREEN

NEWS

### Residents roast in eco-homes' greenhouse effect

*Jonathan Leake, Environment Editor* Published: 10 May 2015

Comment (4) Print




GSA

search RADAR

Research | Visit GSA | About GSA | Support GSA

OVERHEATING IN SCOTLAND: LESSONS FROM 26 MONITORED LOW ENERGY HOMES

Morgan, Chris, Foster, Janice, Sharpe, Tim and Poston, Anna (2015) *OVERHEATING IN SCOTLAND: LESSONS FROM 26 MONITORED LOW ENERGY HOMES.* In: CISBAT 2015 International Conference "Future Buildings and Districts - Sustainability from Nano to Urban Scale"., 9 to 11 September 2015, EPFL in Lausanne, Switzerland.

Secured | Details | Profiles

PDF

REQUEST A COPY

# 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**

# Why invest in Passivhaus?

**Extra capital costs can typically be between 3-8%, offset by lower running costs. However, experienced designers have managed to build at no extra cost.**

**Extra capital costs:**

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

**But operational cost savings:**

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

**Plus extra value:**

High build quality; health and comfort benefits

**and**

**LOWER RISK:**

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

Bushbury Hills Primary School: Architype

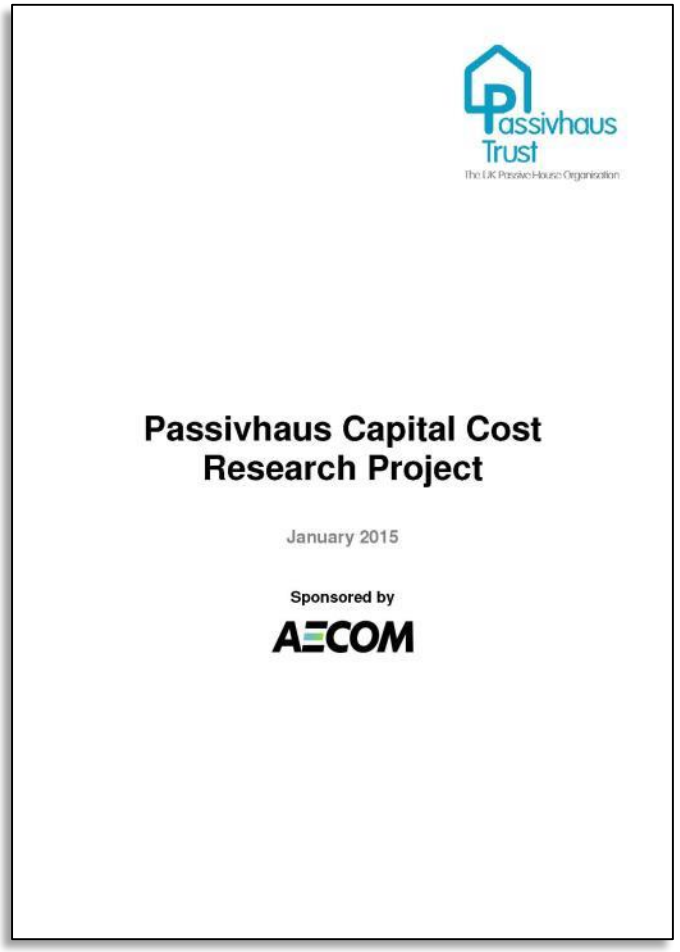
# Comparable capital costs

**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.**

**And added value, lower voids, lower arrears**



# 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!**

# 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**

# 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

# 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

Images top (l-r): Wimbish (Hastoe), Dormont (CCG), Bushbury (Architype), Interserve (Interserve)
Images bottom (l-r): Sampson Close (Orbit), Montgomery School (BAM), Viking House (Van Developments)